

COMPUTERWORLD

THE NEWSPAPER FOR IT LEADERS ■ WWW.COMPUTERWORLD.COM

AUGUST 12, 2002 ■ VOL. 36 ■ NO. 33 ■ \$5/COPY

RIVALS WEIGHING IN AT LINUXWORLD

Microsoft won't 'cause a fuss' at conference

BY CAROL SLIWA

Open-source devotees have been abuzz about Microsoft Corp.'s debut as an official exhibitor at the LinuxWorld Conference & Expo being held this week in San Francisco.

But Peter Houston, senior director of Microsoft's server strategy, claimed that the software maker will "not cause a fuss" at its 200-square-foot booth at the rear of the Moscone Center's North Hall. Microsoft will simply showcase its existing Services for Unix

Microsoft, page 45

Sun to detail plans for promised Linux plunge

BY JAIKUMAR VIJAYAN

Giving a reluctant nod to the widespread popularity of Linux, Sun Microsystems Inc. this week will finally launch a low-end server based on Intel processors and featuring a Sun-branded version of the open-source operating system.

In a keynote address at this week's LinuxWorld conference in San Francisco, Sun Chairman and CEO Scott McNealy will detail the company's plans to release Linux versions of its entire Sun Open

Sun, page 45

GENUITY CUSTOMERS SEEK BACKUPS

Specter of bankruptcy filing alarms users

BY MATT HAMBLIN

With analysts predicting that corporate network services provider Genuity Inc. could file for Chapter 11 bankruptcy protection as soon as today, the company's customers are joining the growing list of IT services users who are scrambling to find alternatives.

Several IT executives last week praised Woburn, Mass.-based Genuity for its reliability and innovation and said the company has reassured them that they won't experience service disruptions. But they all added that they want to be prepared for the worst.

"I'm hopeful Genuity will survive, but from our perspective, we have to plan for the possibility of a shutdown," said Bill Packer, CIO at Irwin Home Equity Corp. in San Ramon, Calif. Irwin pays Genuity "tens of thousands of dollars" each month for managed Web services, *Genuity, page 16*

THE BELL TOLLS

For comprehensive coverage of the issues confronting the telecom industry, visit our Web site.

QuickLink: a2410
www.computerworld.com

NASA INVESTIGATING THEFT BY HACKER

Security gap exposes sensitive documents on plans for future reusable space vehicles

BY DAN VERTON
WASHINGTON

NASA cybercrime investigators are looking into the theft of militarily significant design documents pertaining to the next generation of reusable space vehicles.

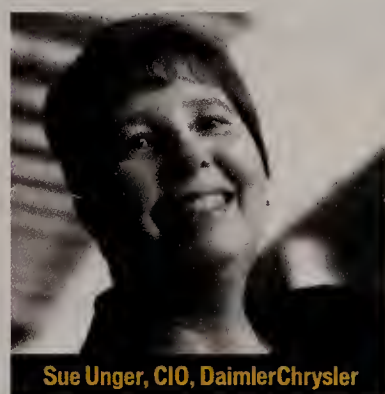
The documents, which are restricted by export laws from being shared with foreign nationals or governments and are also strictly controlled under the International Trafficking in Arms Regulations, were obtained by *Computerworld* last week from a hacker who claims to be based in Latin America. *Computerworld* broke the story online last Thursday.

The documents were authored by contractors from

The Boeing Co. and a joint venture between East Hartford, Conn.-based Pratt & Whitney and Sacramento, Calif.-based Aerojet. All of the vendors had labeled the documents "competition sensitive,"

and while it is not yet clear exactly what sensitive data on military and commercial technologies may have been compromised, defense and intelligence experts said the incident could have both national security and political ramifications.

Bob Jacobs, a spokesman for NASA, confirmed that the documents contain sensitive military information. *NASA Hacked, page 16*



Sue Unger, CIO, DaimlerChrysler

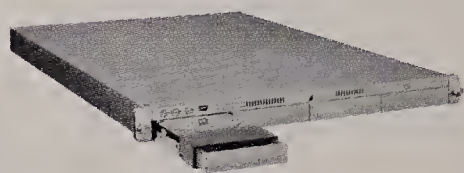
Marv Adams
CIO, FordRalph Szygenda
CIO, GM

SPEED RACERS

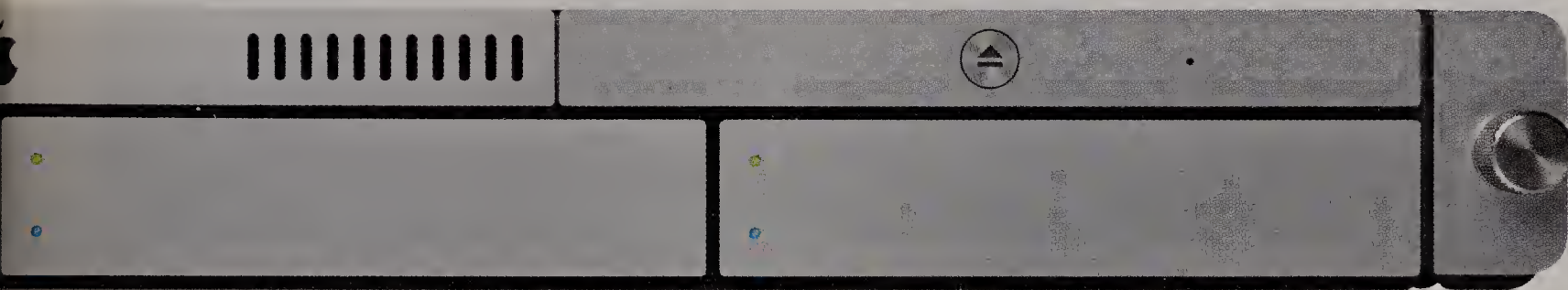
Building and selling cars cheaper and faster than your competitors is the one and only way to stay on top in the auto industry. To win that race, the Big Three increasingly are relying on IT, including sophisticated collaboration software and Internet technologies aimed at creating all-digital operations, from car design to manufacturing, sales and customer support. They're also saving big time, shaving hundreds of millions of dollars each year from their IT budgets. *See page 32.*



Porsche has a 420-hp, water-cooled,



Presenting Xserve, one of the fastest 1U servers on Earth. Featuring the exceptional performance of dual 1 GHz PowerPC G4 processors, each with 2MB of Double Data Rate (DDR) L3 cache. Best-in-class storage, with up to 480GB on four hot-plug ATA/100 drives. And best-in-class networking capabilities with standard dual Gigabit Ethernet ports. Xserve also comes with UNIX-based Mac OS X Server software (with an unlimited client license), making it ideal for providing file and print services, mail and web services, streaming digital media and for running database applications. Xserve is also perfect for computational clustering and I/O intensive applications like digital video, high-resolution digital imagery and managing large scientific datasets. And, thanks



The new Apple Xserve.

twin-turbo power plant. We have this.

to a convenient visual feedback system, you can monitor the performance of an entire rack with just a glance. Or, keep an eye on Xserve from virtually anywhere with Apple's next-generation remote management tools.

Plus, you can swap parts and replace components at will without tools and get instant help with 4-hour onsite response and 24/7 technical support with AppleCare.* Xserve also provides out-of-the-box support for Mac, Windows, UNIX and Linux clients, three PCI slots (two of which are 64-bit, 66MHz), software RAID mirroring and striping, a VGA graphics card, two USB ports and a

host of other features that are far too numerous to list here. Apple Xserve. Take a look under the hood at apple.com/xserve.





Can your software seamlessly integrate Linux into your enterprise?
Ours can.

Linux isn't a fad anymore. It's a serious, mission-critical part of your enterprise. That's why, since 1999, we've been devoted to creating Linux solutions that truly work for global business. Right now, we have more than 50 distributed and mainframe solutions to manage, secure, protect and integrate Linux into your enterprise. But what do you expect from one of the world's most innovative business software companies? Check out our award-winning Linux solutions today. And see for yourself just how well they fit in. ca.com/linux

Business Solutions for Linux



Computer Associates™



VISUAL BASIC AT A .NET CROSSROADS

As they prepare for the object-oriented Visual Basic .Net, project managers must decide what to do with existing Visual Basic 6 applications. **PAGE 22**



DIVIDE, CONQUER AND SAVE

Bart Perkins explains that segmenting your IT vendors according to how strategic they are will improve service levels and strengthen relationships. **PAGE 31**

AUGUST 12, 2002

COMPUTERWORLD THIS WEEK

NEWS

6

6 The latest changes to UCITA don't go far enough, opponents say.

7 Retailers at this year's eTail conference are using new search technology to boost customer confidence and sales.

8 Microsoft will release APIs and protocols as part of its settlement with the government, but analysts and users aren't impressed.

9 The FAA is outsourcing its telecommunications in a bid to improve security and efficiency.

10 Sprint PCS beat its competitors to the 3G finish line with the first nationwide high-speed cellular network. The company is planning a per-megabyte pricing scheme for the service.

BREAKING NEWS

For the latest news, updated twice daily, visit:

QuickLink: a1510
www.computerworld.com

TECHNOLOGY

21

21 For all the talk of innovation from Microsoft and others, there's not much that's new in the world of IT, says columnist Nicholas Petreley.

26 A low-cost alternative to Microsoft Office could work for some — but not all — enterprise IT users.

28 QuickStudy: IT professionals have long demonstrated a propensity for formulating "laws," both serious, like Moore's Law, and not so serious. Read about some of these eternal verities in this week's tutorial.

29 Security Journal: Vince Tuesday investigates how easy it would be to steal money from his company. The answer: difficult, but not impossible.

MANAGEMENT

31

32 The Big Three automakers each need to design, build and sell cars faster than the other guy. Increasingly, that means consolidating, standardizing and simplifying IT.

35 Outsourcing relationship managers are gaining ground at companies that are entering into increasingly complex agreements with multiple IT service providers.

36 Security audit information from multiple sources is flooding IT departments. But help is available from the growing number of managed security service providers.

38 Career Adviser Fran Quittel counsels a worried IT manager looking to polish his skills as his company prepares for a merger.

38 An IT specialist who tracks staff changes for the Food and Drug Administration says her group's ability to adapt to change has aided its security efforts.

OPINIONS

18

18 Maryfran Johnson admits she has a crush on Tux, the utterly adorable Linux penguin. But more important, she says, is the fact that IT is losing its heart to the open-source operating system.

18 Pimm Fox observes that retailer REI can't predict the weather, but new tools are letting it accurately forecast the performance of its e-commerce operations.

19 David Moschella says IBM's proposed acquisition of PwC is taking it further away from its product roots, which in the long run will give Hewlett-Packard a leg up.

46 Frank Hayes wants UCITA backers to quit tinkering with their current lousy law and just write a new one from scratch.

Editorial/Letters	18, 19
How to Contact CW	44
Company Index	44
Shark Tank	46

WWW.COMPUTERWORLD.COM

ONLINE

STAR GAZING

For a closer look at StarOffice 6.0, read the Hands On review online.
QuickLink: 31930

FTC PASSPORT DECISION

What do you think of the FTC's decision on Microsoft's Passport program? Post your thoughts and read what others have to say in our online forum.

QuickLink: a2400

NEWS STRAIGHT TO YOUR IN-BOX

Be sure not to miss any news you need. Sign up for our free daily and weekly e-mail newsletters. You can get the latest news headlines and Shark Tank delivered daily, as well as weekly newsletters on more than 20 subjects.

QuickLink: a1430

WHAT'S A QUICKLINK?

On some pages in this issue, you'll see boxes with this arrow icon. They mention QuickLink codes that point to additional, related content on our Web site. Just enter that code into our QuickLink box online, which you'll see at the top of each page on our site.

Use QuickLinks to see related stories, discussion forums, research links, archives and more.

AT DEADLINE

WorldCom Admits to \$3.3B More in Errors

WorldCom Inc. said it had discovered \$3.33 billion in accounting errors dating to 1999 in addition to the \$3.85 billion worth of errors that it already acknowledged for last year and this year's first quarter. As a result, the company is expanding a plan for restating its financial results to include 2000. WorldCom also cited an additional \$501 million in planned income reductions, for a total of \$7.68 billion.

Vendors Team on Web Services Specs

Microsoft Corp., IBM and BEA Systems Inc. proposed a set of specifications for coordinating internal and external business transactions in Web services applications. The companies detailed an XML-based language for defining how business processes built around Web services should interact, as well as a pair of protocols for managing and monitoring such transactions.

Rescue Deal OK'd For Global Crossing

Global Crossing Holdings Ltd. said a \$750 million deal under which companies in Hong Kong and Singapore will buy majority control of the network operator was approved by its creditors and a U.S. Bankruptcy Court judge in New York. Bermuda-based Global Crossing said it expects to emerge from Chapter 11 protection early next year.

C&W Hits Akamai With Patent Suit

London-based Cable & Wireless PLC (C&W) filed a suit in U.S. District Court in San Francisco accusing Akamai Technologies Inc. of infringing on a patent related to optimal-routing technology. Cambridge, Mass.-based Akamai said the claims made by C&W are meritless.

UCITA Fixes Fail to Appease Opponents

New push expected in states next year

BY PATRICK THIBODEAU
WASHINGTON

THE NATIONAL group behind the controversial software licensing law known as UCITA has removed the contentious "self-help" provision that gives vendors remote access to their customers' systems. The intent is to defuse the law's vociferous opposition and boost prospects for state-by-state passage.

But opponents say the Uniform Computer Information Transactions Act (UCITA) still gives vendors the ability to sell systems with secret back doors.

"It's a nightmare," said Jean Braucher, a law professor at the University of Arizona in Tucson, describing the twists and turns in UCITA's language. She says that certain clauses let vendors alter agreements after payments are made, set limits on liability and build system back doors that create security problems for users. "At some point, we're going to have a cyberterrorism [incident] and lawmakers are going to start paying attention," said Braucher, a longtime critic of the law.

But Emery Simon, counsel for the Business Software Alliance, a vendor trade group here, said UCITA's opponents "are seeing a lot of threats that are really not there."

"I don't know of any software company that has done that or

has plans to do that," Simon said, referring to back doors.

But there's anecdotal evidence that vendors want the means to enter customers' systems. UCITA-like provisions, including the notorious self-help, have turned up in software contracts that David Lewis, CIO at Deseret Mutual Benefits Administrators in Salt Lake City, has been asked by vendors to sign. "I told them to get it out — I won't sign it with this in here," said Lewis. The contracts were changed.

When UCITA was offered for state adoption by the National Conference of Commissioners on Uniform State Laws (NCCUSL) in 2000, two states, Maryland and Virginia, acted quickly and approved it. But efforts in other states stalled as

Sun, HP Bolster Unix Servers With Faster CPUs

Rivals match each other's processor moves

BY JAIKUMAR VIJAYAN

Unix server rivals Sun Microsystems Inc. and Hewlett-Packard Co. last week separately upgraded their product lines by adding models that feature faster and more powerful processors.

Sun added new versions of its Sun Fire 3800, 4800, 6800, 12K and 15K servers that are based on the company's latest UltraSPARC III chip. The 1.05-GHz processor delivers a 15% performance boost over the previous 900-MHz UltraSPARC III device, Sun said.

The upgraded servers also feature a Sun technology called UniBoard that lets users run both the 900-MHz and 1.05-GHz processors in a single partition within the same server.

Sun said the CPU/memory board technology makes it possible to upgrade processors incrementally and to do so without having to bring down an entire system.

HP, meanwhile, refreshed both the server line based on its PA-RISC processors and the AlphaServer product family that it bought as part of its acquisition of Compaq Computer Corp. in May.

HP said its 875-MHz PA-8700+ processor, which was introduced in the company's high-end Superdome server two months ago, is now also available in the 16-way rp8400, eight-way rp7410 and four-way rp5400 series of systems. Those machines previously topped out with a 750-MHz processor.

**POWER
PLAY**

In addition, HP introduced a two-processor AlphaServer DS25 system that uses a 1-GHz Alpha processor and added a 1.25-GHz version of that chip to the AlphaServer ES45.

The company also said its GS80, GS160 and GS320 systems will be upgraded with a 1.224-GHz processor later this month.

Processor upgrades such as the ones announced by Sun and HP can offer a relatively easy way for users to improve the performance of their Unix servers, especially if they're using "old and obsolete systems," said Charles King, an analyst at The Sageza Group Inc. in Mountain View, Calif.

"But in the current economic environment, most people will look at these incremental upgrades and say, 'That's nice, but I can get by with what I have for another year,'" King predicted. ▀

DOING DOUBLE TIME

Sun plans to put two of its UltraSPARC IV processors on a single piece of silicon.

QuickLink: 31994
www.computerworld.com

A Better UCITA?

Several changes to the law were approved in an effort to win over opponents:

- Vendors won't be allowed to disable systems in contract disputes.
- UCITA won't override state consumer protection laws.
- Vendors won't be able to silence critics through contracts.
- Reverse-engineering will be allowed for interoperability.

opponents, representing businesses, library associations and consumer groups, mounted grass-roots opposition.

The NCCUSL also faced criticism from a special American Bar Association committee that called for a major rewrite.

Pushing On

The NCCUSL responded this month with changes affecting self-help, consumer protection and reverse-engineering, among other features. The Chicago-based group intends to renew its push for state-by-state adoption next year.

Despite their success so far, opponents know they have a fight ahead. "I would like to think it's dead, but I think it's more like a hibernation," said Randy Roth, formerly purchasing director at Principal Financial Group and now a consultant at Corporate Contracts LLC in Des Moines, Iowa.

UCITA's proponents hope the changes peel away some opposition. And so far, at least one group is happy. The American Committee for Interoperable Systems, which comprises vendors such as Sun Microsystems Inc. and NCR Corp., fought for reverse-engineering for the purposes of interoperability — a change that was approved. Jonathan Band, the group's legal counsel in Washington, said that was the only concern his organization had about UCITA. ▀

TIME FOR UCITA 2.0

Forget UCITA as it stands and start from scratch, says Frank Hayes. Page 46

E-Retailers Seek Improved Search Engines

*Many customers
who seek but can't
find just give up*

BY CAROL SLIWA
BOSTON

Clickstream data analysis showed Lands' End Inc. that "search" was the No. 1 destination for visitors to its online commerce site. But much to its frustration, further investigation revealed that shoppers came up with "no results found" more often than the company would have liked.

So Dodgeville, Wis.-based Lands' End, which was purchased in June by Sears, Roebuck and Co., joined the growing number of retailers that are

abandoning their old home-grown or packaged search engines and spending money on new software that they hope will help to improve search engine performance and, ultimately, boost customer satisfaction and sales.

Several retailers attending last week's eTail 2002 conference here said they have implemented, are in the process of installing or hope to soon explore more accurate search engine technology that's being put out by vendors such as EasyAsk Inc., Endeca Technologies Inc., Mercado Software Inc. and Verity Inc. (see box).

"You cannot take your eye

off the basics; you need to do them well," said Sam Taylor, a vice president at Lands' End.

Harley Manning, an analyst at Forrester Research Inc. in Cambridge, Mass., said increasing numbers of clients have shown interest this year in search engines, which start at \$100,000 but typically cost

\$200,000 and up. "It seems like search is so fundamental that people should have been focusing on it all along," Manning said. "The reality of

the situation is that there was a great assumption that search was actually working just fine."

Many retailers don't even have search capabilities on their sites, said Geri Spieler, an

analyst at Stamford, Conn.-based Gartner Inc. In a report published earlier this year, Spieler listed the lack of search capabilities as one of the most egregious mistakes many retailers have made when designing their online businesses.

Cathy Hotka, vice president of IT at the National Retail Federation in Washington, said retailers historically have faced difficulties when trying to come up with product definitions. "It's one thing if a shopper is looking for a commodity item like a 2-liter bottle of Pepsi," she said. "It's another thing if they're looking for a slinky black skirt."

That's the sort of problem that The Talbots Inc. in Hingham, Mass., sought to address with its enhanced search engine from EasyAsk. Talbots' old keyword-driven engine was limited to the descriptive terms employees entered into the system, said Jan Linert, manager of online marketing at Talbots. Its new EasyAsk engine can handle natural-language searches and can even process a request with multiple elements, such as "purple sandals under \$50."

Browsers Become Buyers

Linert said Talbots has already seen results since launching the search engine in March. The average order size for shopping carts that hit the EasyAsk search engine vs. the old one has increased 18%, and the number of shoppers who search and then purchase items has risen 34%, he said.

Several retailers said they didn't realize the extent of their search engine woes until they implemented better data analysis tools. Lands' End even did usability studies at a market research facility, watching shoppers try to perform a list of specified tasks.

Michael Crotty, vice president of marketing at Neiman Marcus Online in Dallas, said his company knew anecdotally that its search engine wasn't ideal. But it wasn't until it used data analysis tools that it realized visitors were just leaving the site once their requests came up empty. Neiman Mar-

Searching for The Right Engine

Harley Manning, an analyst at Forrester Research, categorizes search engine vendors as follows:

1. Best with structured data in a database, such as a product catalog: **EasyAsk, Endeca, Mercado and Verity (K2 Catalog).**

2. Able to handle unstructured content with complicated relationships: **InQuira, iPhrase Technologies and Verity.**

3. Optimized for real-time indexing: **Fast Search & Transfer, Inktomi, AltaVista.**

4. Geared toward sophisticated users willing to refine their searches; borders on data mining: **Inxight Software and ClearForest.**

5. Relevance mined from number of hyperlinks in document set and what links say: **Ask Jeeves (through Teoma purchase), Google, LookSmart (through WiseNut purchase).**

SAP, Temple Professors Team On CRM Benchmarking Tool

*Software vendor will share data with
prospective users in chemical industry*

BY LINDA ROSENCRANCE

SAP AG's U.S. subsidiary is teaming up with two Temple University professors to develop a benchmarking tool that's designed to help chemical companies assess their customer relationship management (CRM) capabilities.

SAP America Inc. last week said it has issued a research grant to the professors to fund their work on the benchmarking

tool, which will be limited to prospective users of SAP's CRM applications. Neither the professors nor SAP would disclose the amount of the grant.

The funding will be used to develop a model for reducing the risks of CRM initiatives, said Rosalie Ocker, an assistant professor of MIS at Temple's Fox School of Business and

Management in Philadelphia. Ocker is working on the project with Susan Mudambi, an assistant professor of marketing at Temple.

Ocker said SAP wants to focus first on chemical companies since they haven't been early adopters of CRM technology. The benchmarking

tool is expected to be made available to users in other industries, but specific plans for doing so haven't been set yet.

The professors plan to survey more than 40 chemical companies about their corporate structures, IT setups and various performance metrics. Companies will then be able to use the data to measure themselves against their peers in such areas as order capture rate, order processing time,

percentage of incorrect shipments and on-time delivery of products, said Mark Pyatt, SAP's director of CRM product marketing for manufacturing process industries. He said SAP will use the results of the survey to help users of its business applications and prospective customers to identify business processes that would benefit from CRM installations.

The research project is due to be completed in September 2003. SAP will distribute copies of Ocker and Mudambi's final report to its sales force, Pyatt said.

Leif Eriksen, an analyst at AMR Research Inc. in Boston, said data derived from the benchmarking survey could show companies where they should be doing better in dealing with their customers and help them to prioritize CRM-related IT projects. "Chemical companies are no different than companies in other industries," he said. "They sometimes struggle to figure out where they're falling short." ▀

CUSTOMER CARE

For more coverage of CRM technology and issues, head to our Knowledge Center.

QuickLink: k1300
www.computerworld.com

**RESEARCH &
DEVELOPMENT**

BRIEFS

Microsoft Patches Content Server Holes

Microsoft Corp. issued a patch designed to plug three security holes in its Content Management Server 2001 software, which is used to develop and manage e-business Web sites. The most serious of the flaws involves the software's user authentication function. That security hole could let attackers gain full control of unprotected systems via a Web page that's installed by default, Microsoft said.

Retail Group Backs UCC Data Registry

The board of the Voluntary Inter-industry Commerce Standards Association endorsed a product data registry and data synchronization technology developed by the Uniform Code Council Inc. (UCC) as standards for the retail and consumer goods industries. Both organizations are in Lawrenceville, N.J. More than 20 top companies urged adoption of the technology last spring [QuickLink: 30393].

Coca-Cola Cuts IT Staff by 14%

The Coca-Cola Co. said it has cut about 140 workers from its corporate IT staff, reducing its technology workforce by 14%. The Atlanta-based company said the cutbacks are part of a reorganization that has been in the works since February. The IT department is now focusing primarily on projects that directly affect customers, Coca-Cola added.

Short Takes

The U.S. DEFENSE ADVANCED RESEARCH PROJECT AGENCY agreed to help fund research by IBM aimed at reducing the power consumption of high-end systems. . . . The 30-nation ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT released an updated set of cybersecurity guidelines.

Users Question Benefits Of Microsoft Disclosures

Company says information will give vendors new means of interoperability

BY PATRICK THIBODEAU
WASHINGTON

MICROSOFT Corp.'s plan to release a slew of Windows operating system interfaces and protocols has left end users and analysts unimpressed and its antitrust foes unsilenced.

Under the pending settlement with the U.S. Department of Justice, Microsoft is obligated to disclose interfaces that are the keys to interoperability. The company last week said it will release 385 application programming interfaces (API) and communications protocols as part of the agreement.

But analysts contend it could take 12 to 18 months before vendors release products incorporating the interfaces — if they use them at all.

And the engineering investment needed to sift through 5,000 pages of documentation for the 113 new communications protocols alone may not be worth it once it's balanced against royalty licensing fees, a product's present level of interoperability with Windows and the prospects that the protocols could rapidly change. No royalty will be charged for the APIs.

Doubts Persist

One vendor seeking better technical information is Novell Inc., but the company declined to comment on the specifics of Microsoft's release.

Novell spokesman Bruce Lowry described the settlement as "flawed." He said, "We don't believe the settlement Microsoft reached with the DOJ is sufficient to change Microsoft's behavior."

In court last March, Novell Chief Technology Officer Carl

Ledbetter, testifying for the nine dissenting states that are seeking tougher remedies, accused Microsoft of withholding interface data that would allow competing products to run on Windows as well as Microsoft's own products.

Microsoft has denied doing that and said its new interface disclosure wouldn't improve interoperability but would instead give vendors new ways to interoperate.

The benefits are unclear to one heavy Novell user. Michael Schwab, senior manager of information systems at Taconic Farms Inc., a biomedical products company in Germantown, N.Y., said he's pleased with the interoperability he has between Novell products and Windows.

Compliance

Microsoft has taken a number of steps to comply with the antitrust settlement it reached with the Department of Justice in November. The settlement is pending in federal court.

CONFIGURATION: Service packs for Windows XP and Windows 2000 will include the ability to hide middleware.

DISCLOSURE: Microsoft is releasing APIs and communications protocols for Windows.

LICENSING: PC makers will get uniform terms.

But Schwab said he wonders if Microsoft will "bury key pieces of information deeper into the operating system," making it more difficult for other manufacturers to write code against their operating system.

Ed Black, who heads the Computer & Communications

Industry Association, a Washington-based trade group backing the nine dissenting states, said the more information that Microsoft discloses the better.

"But it doesn't mean that they have disclosed all the essential information they need to," Black said.

He said the federal settlement has problems because "it doesn't have a definition of interoperability to measure" the disclosures against.

Mike Gilpin, an analyst at Giga Information Group Inc. in Cambridge, Mass., said he sees "minimal value" from the disclosures for most independent software vendors, except those that are writing at "low level," such as operating system utility vendors.

Microsoft's settlement with the government hasn't been accepted by the federal judge hearing the case, who could impose tougher requirements on the company. ▀

FTC, Microsoft Settle on Passport Probe

Microsoft will have to increase security and privacy for personal information collected by its Passport single sign-on Web services and will be subject to independent compliance audits every two years under a settlement announced last week by the U.S. Federal Trade Commission (FTC).

In a case that began last year when privacy groups raised concerns about inadequate security in several versions of Passport, the FTC announced that Microsoft has agreed to stop misrepresenting the security of Passport and the kinds of personal information it collects about users.

No security breaches were uncovered by the FTC's investigation, but the potential for problems was present in the software, said FTC Chairman Timothy Muris at a news conference in Washington announcing the settlement.

Although no fines were imposed, Microsoft would be subject to fines

of \$11,000 per violation per day if it is found to violate the terms of the agreement.

In a conference call, Microsoft general counsel Brad Smith said the company cooperated fully in the FTC investigation and has recently put "specific processes into place" to ensure compliance.

"Clearly, the FTC is setting a high bar, not only for Microsoft but for our industry when it comes to privacy and security," Smith said. "A level of security that seemed reasonable when we launched Passport in 1999 no longer seems reasonable."

Smith said the company will work to "exceed the high bar the FTC has established."

Asked why Microsoft didn't simply disclose all of the uses for the information it collected from the outset, he said the company just made a mistake.

"If we were perfect, we would never have made any mistakes,"

Smith said. "In hindsight, we have all learned a lot in the last few years. Security is an ongoing process. Everything about this is an ongoing process."

Jason Catlett, the director of Junkbusters Corp., a privacy advocacy group in Green Brook, N.J., called the settlement a "substantive remedy."

"It's very significant that the FTC went in with security auditors and found information being collected and security procedures that were grossly deficient," he said.

In Catlett's view, the only thing missing from the settlement is a requirement that Microsoft destroy the information it collected using deceptive means.

"I would have preferred that they force Microsoft to disgorge the data, but it is a substantive remedy," he said. "Anyone concerned about privacy would commend the commission for doing it."

— Todd R. Weiss

FAA Outsources Network, Reviews Security

Deals focus on protecting agency's systems

BY DAN VERTON
WASHINGTON

Under pressure since the Sept. 11 terrorist attacks to improve efficiency and security at airports nationwide, the Federal Aviation Administration awarded two IT contracts within the past 30

OUTSOURCING

pose was to cut costs and improve efficiency. But things changed quickly after Sept. 11, so the FAA revised the contract and added new, undisclosed IT security requirements. In fact, in an interview in February, FAA CIO Dan Mehan acknowledged that a change in the contract's award date from last October to this year was partly due to the new emphasis on security.

In addition to the FTI deal, the FAA on July 23 contracted with Herndon, Va.-based Net-

work Security Technologies Inc. (NetSec) for real-time vulnerability assessment and security consulting that will focus specifically on how changes to the nationwide FAA IT architecture could impact security. That deal could be worth up to \$180,000, said William Shumann, an FAA spokesman.

"Anytime you make a change in hardware or software, there's always the potential of introducing a risk," said Bob Reed, a senior vice president at NetSec's Government Professional Services division. The FAA's nationwide architecture is made up of more than 70,000 pieces of equipment, including computers, routers, hubs and

switches, Reed said.

Changes in a massive, nationwide architecture such as the FAA's network can open up a number of different security gaps, said Shumann. And IT changes "happen all the time," he said. "We're updating at different levels of the architecture continuously."

That can be dangerous, especially if changes aren't checked against existing security policies and security requirements aren't spelled out in advance for network architects, said David Endler, director of technical intelligence at iDefense Inc., a security consulting firm in Chantilly, Va.

"There's always a struggle between convenience, urgency and security," Endler said. "Change doesn't have to be a factor in security." ▀

The Harris FTI Team

To win the FAA contract, Harris teamed with the following strategically located service providers in order to set up a single, "in place" infrastructure.

- BellSouth Corp.
- Qwest Communications International Inc.
- SBC Communications Inc.
- Sprint Corp.
- Verizon Communications
- Raytheon Technical Services Co.

Start-up Aims Software at Secure Instant Messaging

IM-Age tool joins others developed for corporate chat apps

BY JAIKUMAR VIJAYAN

Houston-based start-up IM-Age Software Inc. last week added its name to the growing list of vendors that are offering products aimed at fostering more secure use of instant messaging (IM) software within corporate networks.

The company said its IM-Age for Desktops tool lets IT managers capture, archive, audit and report on all IM traffic generated by public client software such as America Online Inc.'s Instant Messenger and ICQ products and Microsoft Corp.'s MSN Messenger.

IM-Age's tool, which users install on their desktop systems, also offers security features such as user authentication and an option that lets users encrypt both internal and external IM sessions (see box). Prices start at \$39.95 per user.

IM-Age for Desktops

- Captures and archives IM communications without requiring firewall-level changes by IT managers
- Supports IM software developed by AOL, Lotus, Microsoft and Yahoo
- Authenticates users and encrypts messages using Blowfish 448-bit encryption
- Scans messages for selected keywords and provides "alert" reports to administrators if it detects them

Richard Stiennon, an analyst at Gartner Inc. in Stamford, Conn., said IM-Age's tool and others already on the market address an area of growing concern for companies: how to control the unfettered use of public chat software on corporate networks while taking advantage of its benefits.

Some companies have run into major problems because of the inherent weaknesses of public IM clients, such as their susceptibility to viruses or the

ease with which outsiders can snoop on conversations, he said.

The capabilities that IM-Age's software provides can help companies get a handle on their IM use and comply with the auditing and reporting requirements mandated by regulations such as the Gramm-Leach-Bliley Act, said IM-Age CEO David Pulaski.

For example, Calpine Corp. is using the software to store and audit IM messages in anticipation of regulatory requirements. The San Jose-based power generator has installed IM-Age's tool on 200 desktops in its energy trading group and plans to eventually roll it out to more than 3,500 users, said Stephen Webster, director of infrastructure engineering.

Calpine evaluated several products but chose IM-Age because it was compatible with all the IM applications being used within the company and was inexpensive and easy to install, Webster said.

"Just about every other vendor we looked at had either a proprietary client or proprietary middle-tier server, or it involved reconfiguring ports on the firewall," he said.

Other companies that offer products or managed services aimed at providing secure IM capabilities include WiredRed

Software Inc. in San Diego, Communicator Inc. in White Plains, N.Y., Raytheon Co. in Lexington, Mass., and Omnipod Inc. in New York.

But while IM-Age is focusing on public IM software, proprietary client technology can offer more robust security features and is tuned better for corporate needs, said WiredRed CEO Allen Drennan. For instance, he said, WiredRed's ePop Audit and Reporting Server technology lets companies group users by role and department and is interoperable with existing directory structures.

"It's also a standard internal application," said Kevin Ott, vice president of technology at Terra Nova Trading LLC, a financial services firm in Chicago that uses ePop. "I don't have to worry about my users signing up for an external third-party application, and I don't have to worry about my traffic going over a public network." ▀

Network Plans

The FTI network will connect more than 5,000 locations and replace more than 30,000 circuits. In addition, Harris will install a series of redundant circuits to ensure the reliability of the nationwide network, which will carry everything from administrative data to air traffic control communications, said Harris spokesman Sleighton Meyer.

"This network has to be the most highly reliable network in the world," he said.

Because FTI had been in development for almost four years prior to the Sept. 11 terrorist attacks, its initial pur-

Correction

The chart accompanying last week's page 14 story on proposed copyright legislation listed the wrong House bill number. The correct bill number is HR 5211.

Sprint PCS Launches Nationwide 3G Network

Adopts per-megabyte pricing, wooes corporate users with easy e-mail access

BY BOB BREWIN
NEW YORK

SPRINT PCS GROUP last week won the 3G technology race by launching the first nationwide high-speed cellular data service.

Sprint PCS now offers 50K to 70K bit/sec. data service on what it calls its PCS Vision network through its 25,000-plus cell sites, said Charles Levine, president of Overland Park, Kan.-based Sprint PCS.

Ritch Blasi, a spokesman for AT&T Wireless Services Inc. in Redmond, Wash., acknowledged that Sprint was able to offer nationwide coverage first, "but only by a few months. Our high-speed service will be nationwide by the end of the year."

Like its competitors, Sprint PCS adopted per-megabyte pricing, which works out to roughly \$1 per megabyte for heavy users and \$2 per megabyte for less-frequent users.

Unlimited Use for a Limited Time

Phil Bowman, Sprint PCS's vice president for business marketing, said in an interview that for a limited time, the company will offer unlimited usage for \$49.99 per month. That price will later increase to \$99.99 per month, matching the unlimited-usage pricing offered by Verizon Wireless in Bedminster, N.J.

Sprint PCS plans to phase out the unlimited usage scheme, Bowman said, because it believes its package plans offer better deals to average users. He said in-house studies show that the plan offering 70MB of data per month for \$79.99 will satisfy all but the most voracious mobile workers.

Bowman added that Sprint

PCS will provide discounted prices to large organizations, but he declined to provide any specifics.

The company will also roll out a new telemetry service hosted on its new third-generation (3G) network to satisfy users who send and receive short, "bursty" packets of data from multiple mobile units. The telemetry service will also support applications such as remote reading of utility meters.

By deciding to use per-megabyte pricing like the other cellular carriers, Sprint runs the risk of confusing cus-

tomers, who may have a hard time estimating their mobile data usage, said Tim Scannell, an analyst at Shoreline Research in Quincy, Mass. "The problem with all high-speed wireless plans is cost," he said.

E-Mail Deals

Bowman said Sprint PCS wants to land as many large enterprise customers as possible for its new 3G network, which was built to allow easy access to enterprise e-mail systems. Sprint is also offering a Handspring Treo personal digital assistant (PDA) priced at \$499 that can be easily tied into corporate e-mail systems, he said. Sprint PCS will charge \$10 per month for a single user of the e-mail service and \$5 per

month per user for companies that host their e-mail systems through Sprint PCS.

Gary Robertson, chief technology officer at Delphi Corp. in Troy, Mich., said that while Sprint may boast nationwide coverage, he remains skeptical of such claims, because cellular companies have built their networks to serve major population centers. And since he already experiences dropped voice calls in Detroit on both the AT&T Wireless and Verizon Wireless networks, Robertson said, he isn't about to provide users with a laptop or PDA cellular data service that could be equally uncertain.

Robertson also said he believes Sprint PCS "made a mistake" by basing its network on

Sprint PCS's 3G Data Service

■ Available nationwide through 25,000-plus cell sites.

■ 50K to 70K bit/sec. average speed, with bursts to 144K bit/sec.

■ Per-megabyte pricing for enterprise laptop and PDA users ranges from \$39.99 a month for 20MB of data to \$79.99 a month for 70MB of data and \$119.99 a month for 120MB of data.

■ Enterprise services will be sold through five major partners: Accenture, Hewlett-Packard, IBM Personal Computing Division, Ingram Micro and PwC Consulting.

Code Division Multiple Access technology, which is widely used in the U.S., rather than on the next-generation General Packet Radio Service of the Global System for Mobile Communications standard that is used in Europe.

International companies like Delphi want international standards, Robertson said. ▀

Wireless Spectrum-Sharing Plan Submitted to FCC

BY BOB BREWIN

Corporate users that operate private wireless systems, along with public-safety communications systems operators and Nextel Communications Inc., last week submitted to the Federal Communications Commission a plan designed to reduce interference between their systems in the 800-MHz spectrum.

The plan would also cost less than an earlier proposal developed solely by Nextel.

The compromise plan would reduce interference between public-safety and industrial users and Nextel's cellularlike system by allocating discrete blocks of 800-MHz frequencies to those users and to Nextel. Currently, spectrum users operate on interleaved channels within the band, which increases interference.

However, the nation's utili-

ties companies sharply oppose the new plan, citing what they see as burdensome expenses with little benefit. Jill Lyon, vice president and general counsel of the United Telecom Council, a Washington-based utilities industry communications group, estimated that the cost of relocating business and industrial users under the new Nextel-backed plan "would run into the hundreds of millions of dollars."

The Carolina Power & Light Co. (CP&L) unit of Progress Energy Inc. in Raleigh, N.C., expects the expense to be higher than that. CP&L estimated that the cost of the plan would be "enormous, running several billions of dollars," according to a filing made to the FCC by its lawyer, Jonathan Wiener, from the Washington law firm Goldberg, Godles, Wiener & Wright.

Jeremy Denton, government affairs director of the Arlington, Va.-based Industrial Telecommunications Association (ITA), put the reallocation costs far lower, at "a billion dollars or less."

Denton added that Nextel, a Reston, Va.-based company backed by cellular billionaire Craig McCaw, has offered \$500 million to fund the shift of police, fire and ambulance services to new frequencies in the 800-MHz band. Denton said the ITA was in discussions with Nextel on how to compensate business users who would have to shift frequencies.

No More Than \$500 Million

Bob Foosaner, senior vice president of Nextel, said the company wouldn't spend "a penny more" than the \$500 million it has already pledged to reallocate public-safety users in the 800-MHz band.

Even that figure might be difficult to achieve. "I don't see

how Nextel can raise \$500 million," considering the depressed state of the cellular market, said Craig Mathias, an analyst at Farpoint Group in Ashland, Mass.

Denton said the compromise 800-MHz spectrum allocation agreement "will require less movement [to different frequencies] than any other proposal."

The plan would "mitigate interference substantially" between all users in the band, he noted.

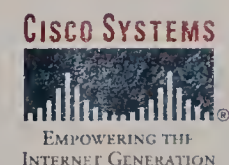
Though Denton said the ITA's membership, which includes major corporations such as General Motors Corp., has signed on to the compromise agreement, a comment filed with the FCC by GM shows little enthusiasm for the plan. Bonita Lewis Bell, a GM lawyer, told the FCC in a July 1 filing that the company "urges the commission to fully consider all nonrelocation solutions before considering any extraordinarily complex alternatives involving relocation." ▀

Besides paying up to \$500 million, Nextel has offered to turn in its existing 700- and 900-MHz licenses to the FCC.



It's not just a logo.
It's a sign of excellence.

To take advantage of rapidly evolving network services and technologies, it can make good business sense to work with a service provider. Just be sure to look for the Cisco Powered Network logo. Whether it's virtual private networks, managed security, managed Web hosting, or any number of services that extend or enhance your company's network, the Cisco Powered Network designation means peace of mind. You can be confident that your service provider will deliver the highest standards of operational excellence, customer service, and support – all over an end-to-end Cisco network. To find a provider that offers Cisco Powered Network services and obtain the white paper, "Strategies for Managed Network Services," visit cisco.com/go/cpn-services



[Find a Service Provider](#)

[White Papers](#)

[Services](#)

[Case Studies](#)

[More Resources](#)

©2002 Cisco Systems, Inc. All rights reserved. Cisco, the Cisco Arrow logo, Cisco Systems, the Cisco Systems logo, and Empowering the Internet Generation are registered trademarks or trademarks of Cisco Systems, Inc.

EMC Adds Disk Array to Speed Midrange Storage

Says CX600 runs up to three times faster than previous Clariion models

BY MATT HAMBLIN

EMC CORP. TODAY plans to launch a higher-performance version of its Clariion network-attached storage system as part of a continuing effort to better address the midrange portion of the storage market.

Analysts said the new Clariion CX600 disk array should help EMC in the upper levels of the midrange sector, which are below the reach of its high-end Symmetrix devices. The CX600 has a smaller storage capacity than EMC's existing Clariion FC4700 model, but it offers three times the I/O processing power and a data cache

that's four times larger.

A single CX600 cabinet holds 165 drives, but its four-chip processing unit can support a total of 240 with the extra drives placed in a separate cabinet, EMC officials said last week. Users can mix drives with capacities of 36GB and 73GB for a maximum storage capacity of 17.5TB (see box). In comparison, the FC4700 uses 181GB drives and has a capacity of 21.7TB.

Rutgers University in New Brunswick, N.J., is a potential CX600 user. The school has already deployed an FC4700 for warehousing data regarding the network usage of its 30,000 potential end users, said Timo-

thy Hayes, manager of network systems at Rutgers.

The array lets IT officials at the university read network connection data for the past 20 days for security purposes. But the CX600's faster performance "could make a difference with searching for data in the warehouse," Hayes said.

Another key feature of the CX600 is its ability to run the same management software as the FC4700 and the Symmetrix boxes that are installed elsewhere on campus, Hayes added. But Rutgers has a lengthy purchasing cycle on IT equipment, and a CX600 installation won't be possible for at least a year, he said.

Analysts said the common management software for the

Symmetrix and Clariion product lines is important technology, especially for larger companies that have installed both types of devices.

"You're starting to see continuity across EMC, and you're really seeing EMC become more mature," said Joyce Becknell, an analyst at The Sageza Group Inc. in Mountain View, Calif. "For a long while, they were only in the high end, and now they're much more sensitive to the customer, partly because of competition."

Midsize businesses that need systems with up to 60 drives represent the fastest-growing segment of the storage market, she added.

Steve Duplessie, an analyst at Enterprise Storage Group Inc. in Milford, Mass., said the CX600 faces its greatest competition from midrange arrays made by Hewlett-Packard Co. and Sun Microsystems Inc. "It's a hot and heavy space, and based on the specifications on

Clariion CX600

DATA STORAGE CAPACITY:
180GB to 17.5TB
I/O PERFORMANCE:
Up to 150,000 operations per second
MAXIMUM BANDWIDTH:
1.3G bit/sec.
DATA CACHE:
Up to 8GB
LIST PRICE:
\$115,000 to \$800,000

paper, EMC should come out on top," Duplessie said.

Hopkinton, Mass.-based EMC is aiming the CX600 most directly at HP's Enterprise Virtual Array device, which scales from 2TB to 17TB with 2G bits/sec. throughput — a performance level that tops the CX600's 1.3G bits/sec. rate.

But Pete Korce, a storage business manager at HP, said it has a big jump on EMC in the midrange market. "We have five to seven times the market share they have," he said. ▀

Reporter Lucas Mearian contributed to this story.

Storage Trade Group Takes Reins on Bluefin Proposal

SNIA will fine-tune specification draft

BY LUCAS MEARIAN

The Storage Networking Industry Association (SNIA) today plans to announce that it has agreed to polish a draft version of the proposed Bluefin standard, which is aimed at letting IT administrators use a single set of storage management tools to control a mix of software and hardware from different vendors.

The 350-page draft specification was written by a group of IT storage vendors, including IBM, EMC Corp., Hewlett-Packard Co. and Dell Computer Corp. The group submitted the proposed standard in May to the Mountain View, Calif.-

based SNIA, which includes a total of about 300 vendors.

Bluefin, which the SNIA has renamed the Storage Management Interface Specifications (SMIS), is a set of common application programming interfaces that has the potential to greatly reduce the amount of work it takes to connect products deployed in multivendor storage-area networks (SAN).

Filling a Need

Kurt Bahrs, a disaster recovery specialist at Aetna Inc. in Hartford, Conn., said Bluefin is "definitely needed, because right now all the solutions are proprietary between the [different] storage products."

Currently, if a company "buys 10 different products, they end up with 10 different management interfaces," said

Arnold Jones, technical director at the SNIA. The trade group expects to demonstrate the draft SMIS specification at the Storage Networking World conference in October, and Jones said some vendors, such as Veritas Software Corp. and Sun Microsystems Inc., may begin shipping compliant products by then.

What Bluefin Will Provide

■ **A common interoperable and extensible storage management transport** based on the CIM and WBEM standards.

■ **A unified and rigidly specified object model** for use in the development of storage management applications.

■ **An automated discovery system** that's supposed to ease the mapping of SANs and the inventorying of storage devices.

■ **Resource-locking features** that will automatically control different client systems' access to a pool of storage.

Further development of SMIS will include interoperability testing aimed at "creating better plumbing" between disparate storage products, according to Roger Reich, chairman of the SNIA's new Storage Management Initiative forum and senior technical director at Veritas in Mountain View.

SMIS uses the Common Information Model (CIM) and Web-Based Enterprise Management (WBEM) standards to support discovery, monitoring and management of storage devices. CIM is an object-oriented model that provides a conceptual framework for managing storage devices; WBEM is XML-based software that creates an interface between storage devices.

One example of the problems SAN users now face is the use of different object models for managing Fibre Channel switches by rival vendors of the devices. When different switches are plugged into the same SAN, the management software has to conform to the lowest

common denominator of functionality — a shortcoming that SMIS is designed to address.

Jones said the SNIA expects to submit the specification to the Washington-based American National Standards Institute within six to nine months. At the same time, the SNIA will release test software that will let product developers check their coding against SMIS.

But there are a variety of barriers to the adoption of SMIS by a wide range of vendors. For example, Reich estimated that it will take another year of work before the SNIA solves problems associated with device lockout and client hierarchy. The latter governs which client systems, such as a set of databases, have priority when competing for access to RAID controllers and other storage resources. ▀

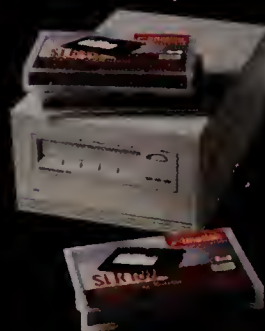
USERS WANT MORE

To read our July 29 Cover Story on storage management issues, go to our Web site.

QuickLink: 31090
www.computerworld.com



Keep up with your growing data.

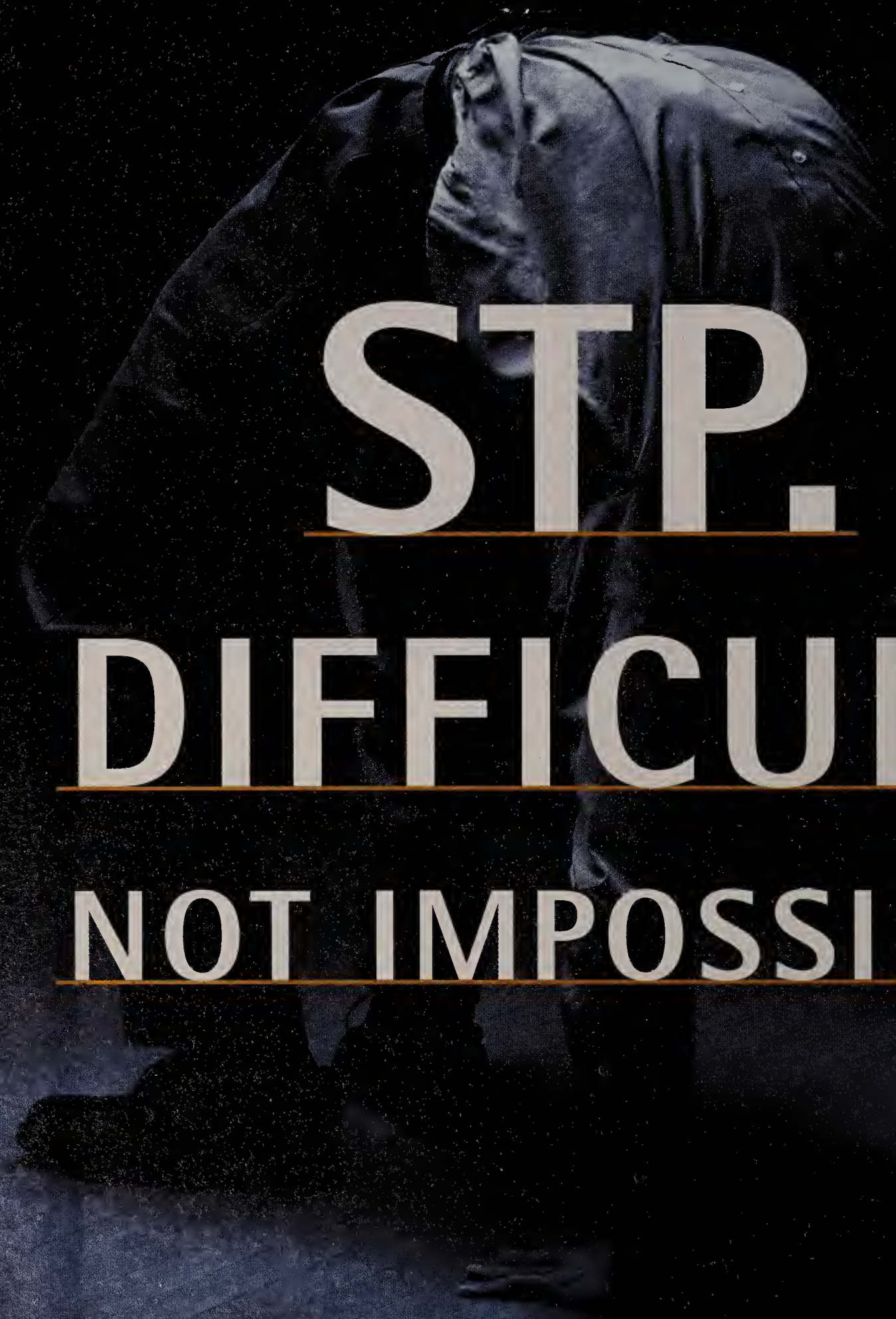


Imation SLR storage technology scales with your data storage needs.

A little or a lot, all of your data is important. And Imation, along with Tandberg Data, developed SLR technology to help you manage it. The best replacement for DDS technology, SLR data cartridges and drives make easy work of backing up and storing data. Anywhere between 525MB and 100GB*. And you can do it confidently with the industry's lowest field failure rate of just 1.5%. These are just a few reasons SLR technology is the best way to stay ahead of growing data. Something Imation has been helping companies do for more than 50 years. Learn all about SLR technology and Imation SLR data cartridges at www.imation.com/slr.

*Assumes 2:1 compression

SLR Technology Development Partner
www.tandberg.com

A black and white photograph of a person wearing a dark, heavy jacket, bowing their head forward in a gesture of struggle, exhaustion, or defeat. The person's face is partially obscured by their hands and the folds of the jacket. The background is dark and textured.

STP.
DIFFICULT.
NOT IMPOSSIBLE.

SYBASE e-BUSINESS SOFTWARE. EVERYTHING WORKS

Straight Through Processing (STP) may require some deep structural re-engineering.

STP demands you expand your computing capacity both to strengthen your back-end infrastructure and provide for future growth. At the same time, you need to add capacity for new STP applications, interfaces and middleware.



And there's the real challenge: integration. Getting everything to work together.

The solution lies in an open, standards-based environment that facilitates cross-organization and cross-industry integration. That's the cost of entry. We can help with all of that.

But to truly be successful, you'll need to find ways to differentiate yourself and create competitive advantage. After all, STP is now the cost of doing business. Success is something else altogether. We can help with that, too.

INTRODUCING FINANCIAL FUSION TRADEFORCE SUITE

TradeForce™ Suite, by Financial Fusion, a subsidiary of Sybase, offers the most complete solution to meet the STP requirements of the trading industry.

Regardless of your infrastructure, TradeForce Suite enables you to standardize your financial messaging system for trade initiation, reconciliation and settlement cycles. High throughput capacity and easy integration with multiple messaging environments facilitates quick and easy trading with all of your customers.

The Software Integration Company

We can help you integrate all the disparate data and business applications running in your enterprise and extend them to any location in the world: platforms, application servers, components, databases, applications, processes, message brokers, even mobile/wireless solutions. By choosing Sybase, you can preserve and extend your existing infrastructure investments, avoid proprietary traps, and improve efficiency across the enterprise.

One of the most important features of TradeForce Suite is Message Broker, an XML-based component that gives an organization unprecedented capability to modify message formats and decrease customization efforts.

TradeForce Suite manages the distribution of financial messages and supports a wide range of protocols, including FIX, SWIFT, FpML, GSTPA, Omgeo, EMX and RITD.

Built on a 100% Java/EJB architecture, TradeForce Suite is completely open to whatever new standards may come along.

Your business is global, and so is TradeForce.

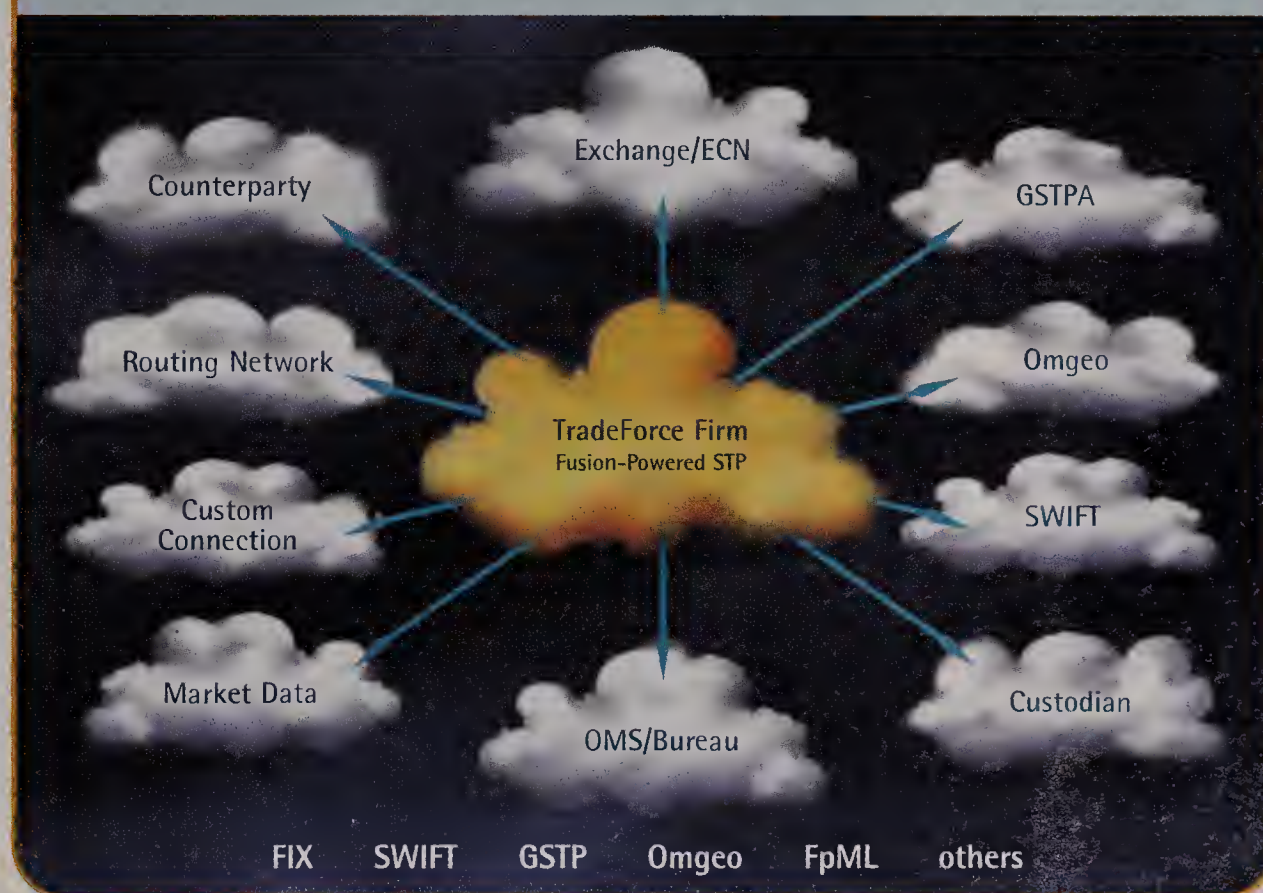
external systems. From front office to back office to trading partners. What's more, it has the flexibility to meet new industry initiatives like FIX over the SWIFT network.

Financial Fusion
A SYBASE COMPANY

FUSION POWERED e-FINANCE™

Financial Fusion, Inc., a wholly owned subsidiary of Sybase, Inc., provides integrated financial solutions to more than 200 of the world's leading financial institutions. Global alliance partners include IBM, Sun Microsystems, and SWIFT.

STP: YOUR FIRST STEP



It lets you pass your trading book seamlessly from office to office, offering your customers more execution options. Plus, it can give you a single view of all of your holdings, enabling more accurate holdings statements and risk assessment.

TradeForce Suite manages everything in a cohesive infrastructure while reducing costs and producing a measurable ROI. It connects and integrates with all of your internal and

For more information on how we can help you get to STP without tying your organization in knots: www.sybase.com/integrationsolutions.

SYBASE
Information Anywhere™

Straight Through Processing (STP) The controlled capture and processing of an order from initiation to trade finality in the eyes of an external party, utilizing human intervention for the pure purpose of adding value. Easier said than done.

Continued from page 1

Genuity

vices on several of its customer-facing Web sites, he said.

But when Irwin heard last month that Verizon Communications was dropping plans to buy back majority ownership in Genuity and would no longer provide it with loans, IT workers at the lending firm dusted off their disaster plan.

Packer said that if Genuity loses its ability to host Irwin's

Genuity Expects No Service Interruptions

Officials at Genuity are pledging to keep the company going despite the financial pressures it faces. Genuity still has \$1.2 billion in cash, and its "business operations will continue without interruption," CEO Paul Gudonis declared in a statement in July.

The IP networking services provider has about 3,500 customers, most of them large businesses or smaller Internet service providers. The most common services Genuity offers are T1 and T3 pipes, but it said some of its big customers lease larger OC48 connections.

Genuity reported revenue of \$1.22 billion last year and \$281.6 million in this year's first quarter. But its losses for those two periods totaled \$3.96 billion and \$257.5 million, respectively.

GTE Corp. spun off Genuity two years ago to meet government conditions for its merger with Bell Atlantic Corp. to form Verizon Communications. On July 25, Verizon relinquished an option to reacquire a controlling interest in Genuity, leaving Genuity in default of credit agreements with Verizon and a consortium of banks.

Genuity said four days later that it had reached a two-week standstill agreement with the banks, which had granted the company a \$2 billion line of credit. The standstill period, which expires today, was meant to give Genuity and the banks time to work out new terms.

—Matt Hamblen

sites, the company will support its Web presence from its own data center as a stopgap strategy while it considers longer-term options. "It's more cost-effective to be with a service provider like Genuity, but you do what's required," he said.

Bentley College in Waltham, Mass., would lose all of its critical Internet capabilities if the T3 Internet connection Genuity provides to the technology-focused school is disrupted, said Traci Logan, vice president for IT at Bentley.

Genuity, which has provided Bentley's T3 link for three years, is bidding against other vendors to continue the service, Logan said. But the school is contemplating the addition of a wireless Internet access plan as a backup, she noted.

Logan said the experience with Genuity and the general business decline of telecommunications firms and Web hosting providers has made her

think twice about the financial stability of IT service providers. "Two years ago, you would look at a provider's technology," she said. "Now you look at their financial viability."

Service Concerns

Terry Rochford, senior vice president of development at MathSoft Engineering and Education Inc. in Cambridge, Mass., said he has been communicating with Genuity since its financial problems arose and feels confident that the company will continue to operate, even if it enters Chapter 11.

"The concern is not that they will disappear overnight, but will they provide the same high level of service?" Rochford said. Genuity hosts five MathSoft Web sites and provides the software developer with a T1 connection, he said.

MathSoft doesn't yet have a backup plan, but it has received "plenty of calls" from Genuity's

competitors, Rochford said. "We wouldn't welcome having to change," he noted.

Genuity wouldn't comment on the possibility of a bankruptcy filing, but today marks the end of a two-week evaluation period that it arranged with its lenders (see story at left). "We plan on continuing to operate our business and providing services," said Genuity spokesman John Vincenzo.

But analysts at Gartner Inc. in Stamford, Conn., and Probe Research Inc. in Cedar Knolls, N.J., said they expect a Chapter 11 filing and urged IT managers to make backup plans. Doing so could be complicated, however, because so many network services and Web hosting firms are in financial straits.

"For the poor IT guys, it's hard to say who they can rely upon," said Probe Research analyst Allan Tumolillo. "There are not that many service providers not on the brink." ■

Tips for Genuity Users

KEEP new contracts short term until the service provider's financial prospects are clearer.

START duplicating data and consider alternative hosting arrangements for Web sites.

CONSIDER using a second service provider for Internet access and your wide-area networking needs.

INVENTORY all of your Genuity services and prepare to seek proposals from other providers in the event of quality problems or disruptions.

REVIEW contracts and make sure you can terminate services without liability if service levels aren't met or if Genuity is acquired.

SOURCE: GARTNER INC., STAMFORD, CONN.

Continued from page 1

NASA Hacked

tary information and should have been stored in a closed database. There is no information on how or from where the documents were stolen, and investigators couldn't confirm whether a hacking incident had taken place.

However, a hacker known only by the nickname RaFa who was formerly a member of the now-defunct World of Hell hacker gang, uploaded to a Web site more than 43MB of documents, including a 15-part PowerPoint presentation that included detailed engineering drawings. The documents also included detailed mechanical design information on the COBRA space shuttle engine design program and the risk-reduction plan for the Boeing TA4 Advanced Checkout, Control & Maintenance System (ACCMS). The ACCMS is essentially the ground control system for the next generation of space shuttles.

Walt Rice, a spokesman for Boeing, said the company

doesn't have enough information on the incident to comment. However, Boeing is aware that NASA officials are investigating, and the company will offer any assistance that's requested of it, he said.

Patrick Loudon, a spokesman for Pratt & Whitney, said that NASA is taking the lead in the investigation and that the company is deferring to the agency for all comments on the matter.

Military Interests

NASA's 2nd Generation Reusable Launch Vehicle Program (RLV) is part of the agency's long-term Space Launch Initiative, a multibillion-dollar effort to design a safer and more efficient space transportation architecture by 2005. The Department of Defense is a key partner in the effort because of its interest in the RLV program's applicability to military satellite programs and future military space plane designs.

RaFa said he didn't understand the sensitivity of the informa-

tion he had and acknowledged that he has shared the documents with hackers in France. He also showed *Computerworld* evidence of a hack into systems at NASA's White Sands Test Facility in New Mexico, producing a list of dozens of user accounts. He claims to have used an anonymous FTP vulnerability to conduct both hacks.

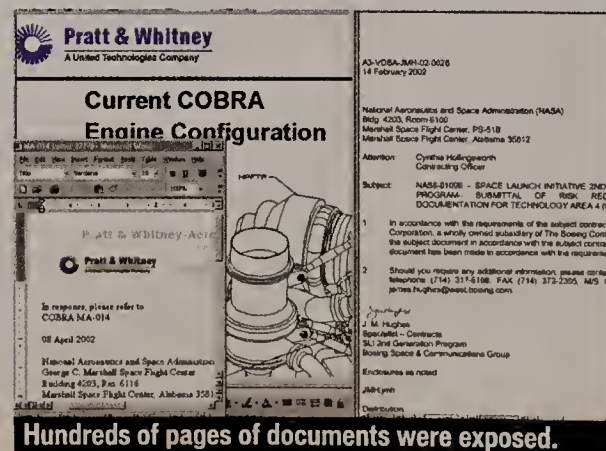
"These particular records would probably be of most interest to a country trying to build their own space launch vehicle," said Steven Aftergood, an analyst at the Federation of American Scientists in Washington. However, "I'm not sure that anyone else could use them, either for good or ill," he said.

On the other hand, "the ITAR provisions are quite strict, and they entail serious penalties for violations," said Aftergood.

Allen Thomson, a former CIA scientist, said this type of information would likely be of interest to so-called peer competitors in the commercial and military space market, such as Russia and Japan. However, the general concern is that the documents could contain information that would be of use in countering the capabilities of a military version of the RLV, said Thomson.

John Pescatore, an analyst at Stamford, Conn.-based Gartner Inc., said the disclosure may represent only "the tip of the iceberg."

"Many limited-distribution documents can be aggregated to indicate very sensitive information," said Pescatore. "Another problem is the ability for someone to modify one of these documents and put it back where they found it. There are many more possibilities for damaging incidents under that scenario too." ■



SPECIAL ADVERTISING SUPPLEMENT

White Paper

August 12, 2002



CIM for Storage: Why It's Important to You

The Common Interface Model and Bluefin hold the potential to simplify storage networking



COMPUTERWORLD
CUSTOM PUBLISHING



Storage and data networks unite.
Information is shared and managed globally.

SOLUTIONS FOR YOUR NETWORK ▼

- VPN/SECURITY +
- STORAGE NETWORKING ►
- IP COMMUNICATIONS +
- CONTENT NETWORKING +
- OPTICAL NETWORKING +
- WIRELESS AND MOBILE OFFICE +

©2002 Cisco Systems, Inc. All rights reserved. Cisco, Cisco Systems, the Cisco logo, Empowering the Internet Generation and Cisco Powered Network are registered trademarks or trademarks of Cisco Systems, Inc.

cisco.com/go/storagesolutions

Now you can make storage resources available anywhere over IP by establishing a system based on open standards. With Cisco storage solutions, you can consolidate storage resources over your existing IP network – enabling you to save money while deploying and managing the most demanding storage application. With Cisco AVVID enterprise architecture, you can do all this without any disruption. This standardized enterprise architecture allows you to seamlessly integrate voice, video, wireless, storage, and data applications on a single, scalable network. This includes new and existing technologies alike. Whether you're building your enterprise network or extending it with Cisco Powered Network services, take advantage of the tools below to get it done right.



[Recent Articles](#)

[Cisco AVVID White Paper](#)

[Storage Networking Webcast](#)

[Cisco Powered Network](#)

CIM for Storage: Why It's Important to You

The Common Interface Model and Bluefin hold the potential to simplify storage networking

The storage industry is watching the adaptation of the DMTF's CIM to storage networking with a skeptical eye. The task is complex, to say the least; it involves many products and requires that many competing vendors find a reason for putting down their swords in the spirit of cooperation and the desire to collectively make a significant contribution to the storage art.

In the words of one storage vendor and SNIA member, "CIM is the most important thing going on right now."

Should users care? Yes. For present users of storage-area networks, SAN costs remain artificially high. For prospective SAN users, the barriers to adoption remain artificially high. CIM for storage networks holds the promise of lowering the cost of SAN implementation and manage-

ment, and the barriers to entry as well. And not so incidentally, it's the first genuine open source movement the storage industry has seen with the power to attract the industry's biggest names.

For users confronting CIM applied to storage, there are some things to keep in mind. First, CIM is a model — a guide to building systems using modules that "plug" together. CIM-compliant storage modules interoperate in a system (in this case a storage fabric) regardless of who built them, provided the modules use CIM

"language" and adhere to sets of specifications called schema.

Second, CIM is object oriented. Virtually anything storage-related, physical or abstract, from complex device management applications to bad sectors on a disk platter, can be defined as a CIM object. A system (a storage fabric, for example) is modeled using objects that have defined attributes. In addition, any object known now or yet to be invented can be defined and encompassed within the model. CIM's object orientation allows storage fabrics to grow and adapt to changes in technology over time without blowing up the model and starting over again.

Third, CIM is command-and-control oriented, unlike Simple Network Management Protocol (SNMP), which is now commonly used to integrate storage management applications at a basic level. CIM for storage is both passive (like SNMP) and active, allowing management applications to not only monitor devices within a storage fabric, but to dynamically configure/reconfigure devices as well. Command and control of both devices and fabrics can be auto-

**Written by
John Webster,
Senior Analyst and
Founder, Data
Mobility Group**

ers to adoption remain artificially high. CIM for storage networks holds the promise of lowering the cost of SAN implementation and manage-

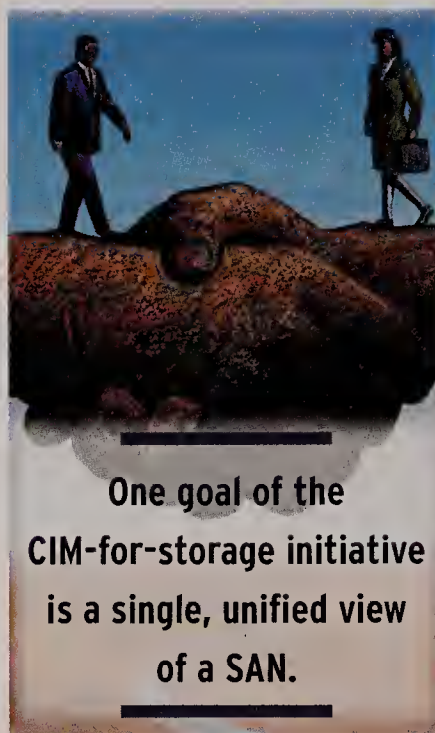
mated using CIM-enabled storage management applications. CIM helps unlock the as-yet-unrealized benefits of intelligent storage fabrics in ways that SNMP cannot.

Finally, SANs are often thought of as single entities, commonly depicted as clouds or referred to as fabrics. CIM allows developers to model a SAN as a single, abstracted entity. Commensurately, one of the goals of the CIM for storage initiative is a single, unified view of a SAN.

How we got here

The manageability of storage networks — or rather the lack thereof — has surfaced as a persistent barrier to SAN adoption. But the critical need to manage a storage network or fabric as a fabric is not the only inhibitor. The security of data residing within a storage network (i.e., protecting data from loss due to administrative error or intrusion) as well as the overall cost of storage networks are two more factors consistently cited as barriers to adoption.

Recently, momentum has been gathering quickly behind CIM (Common Interface Model, pronounced “sym”), a storage industry initiative. The constellation of storage industry vendors that compose the Storage Networking Industry Association (SNIA) has adopted the Distributed Management Task Force’s (DMTF) open source method for defining the devices within a storage network (such as arrays, switches and host bus adapters, or HBAs) as managed objects. The DMTF’s method, which also uses the XML and HTTP standards, is now under-



going an adaptation to storage networking. It’s a why-reinvent-the-wheel approach to solving the storage industry’s most critical problems: manageability, security, and cost. CIM addresses all three at once.

Networks by definition are made up of discrete, interconnected devices. In order to function in a network setting, these devices must be able to perform essential functions such as transmitting data and communicating information that allows devices to cooperate and co-exist with one another. They must also provide a view of the inner workings of each device to an IT administrator (or a management application used by an IT administrator) that allows each device to be managed. CIM addresses the management aspects of storage networks.

Today, there is no shortage of storage networking products. We have arrays, switches, hubs, appliances,

and the list goes on. The good news is that users now have a wealth of alternatives to choose from when architecting solutions. The bad news is that each product is consistently brought to market with its own management interface — some more sophisticated than others, some more proprietary than others. Each is managed in its own way through interfaces that sometimes allow a comprehensive view of the inner workings of the device. Other times, the opposite is the case. Often, users’ view of their networked storage devices depends on how closely their vendors are willing to work with each other, or what partnerships a given vendor has accumulated around the management interface for its products.

A number of unfortunate and sometimes unintended consequences arise from this situation:

- Storage management applications that cover a broad spectrum of devices take a longer period of time to reach the consoles of IT administrators. This happens because developers must write to many different device application programming interfaces, each with its own qualities. These APIs must be obtained through agreement, which means other parts of the developing vendor’s organization (legal, for example) must become involved. In addition, these APIs must be supported over the life of a product, so the developer must track enhancements on a “one-off” basis.

- The cost of storage management solutions (and SAN management solutions in particular) goes up in proportion to the number of device

APIs under management. Typically, product cost is commensurate with functionality. Here, functionality is defined not only by the product's feature set, but the number of devices managed and how deeply into the device a management application can reach. The more devices one manages, the more functionality is built into the product. Having more APIs to manage and maintain adds directly to the cost of development — a cost that is passed on to the IT administrator.

● The process of developing management applications based on collecting disparate sets of APIs insures the survival of the strongest vendors. Developers will naturally write to the most common APIs first, and to the less common ones later — if ever. And just as naturally, the most common APIs belong to the vendors with the largest market share. The ad hoc system now in place artificially perpetuates the survival of the strongest, but not necessarily the fittest.

An ad hoc system that artificially helps insure survival of the strongest storage players has many adverse consequences for both storage users and vendors. The smaller, often more innovative companies can't keep up with escalating product development costs. They wither and die, or ironically are saved from total annihilation by getting swallowed up by a stronger vendor. As a result, strong vendors face reduced incentive to innovate in order to maintain their market positions. The status quo is perpetuated, and innovation is frequently stifled.

Finally, the need to acquire, manage and maintain many device APIs

keeps the cost of SAN management solutions in particular artificially high — a consequence that is detrimental for both storage users and vendors because it slows the adoption rate of new, more innovative, more effective solutions.

What's needed

A way to break the ad hoc system of procuring and supporting device APIs on a one-off basis is to establish a common set of reusable APIs that are made available to any developer who needs them. As a developer working within this open source system for networked storage management applications, you would write code that conforms to an agreed-on

Many users question SAN security. They worry about the exposure of data to intrusion or corruption.

set of API specifications under the assumption that other developers working for vendors with complementary products were using the same specifications.

Think of APIs in this context as plugs and sockets. Imagine yourself as a software developer tasked with writing an application that allows a storage administrator to peer down into the disk array your company sells in order to see what's going on within, as well as make configuration

changes when necessary. As part of that application, you must build in a "socket" so that an administrator, through the insertion of a "plug," can communicate with the array.

The plug could be connected to something as simple as a few lines of code entered through a command line interface, or as sophisticated as an enterprise management application. If the socket is oddly shaped, others will have to build a specific plug to communicate with your array. However, if you choose a standard socket that can accept plugs that are commonly available to anyone, then others can easily communicate with your array.

Standard, reusable plugs and sockets are what the storage industry needs to break free of its present dependence on the ad hoc "you show me yours, I'll show you mine" system of propagating management APIs. Recognizing this as a critical need, the SNIA decided to create and propagate the specifications for these standard APIs.

But rather than reinvent the wheel, the SNIA found another IT industry group that had already overcome essentially the same problem within the broader networking arena — the Distributed Management Task Force (DMTF). Working with the DMTF, a group of SNIA vendors is currently adapting two existing DMTF standards — CIM and Web-Based Enterprise Management standard (WBEM) — to the management of storage networks. This adaptation effort by a group of 16 vendors working together under the auspices of the SNIA is code-named Bluefin.

©2002 Quantum Corporation. All rights reserved. Super DLT Tape and the Super DLT Tape logo is a registered trademark of Quantum Corporation.

DLT
SUPER
TAPE

WHEN FAILURE IS NOT AN OPTION™

**SDLT
320**

Super DLTape™, the ultra-reliable tape backup solution, just blew away the field. Introducing the SDLT 320. With a trunk-filling 160 GB of native capacity and a screaming 16 MB/s native transfer rate, it's the highest-performing tape backup solution on the road today. It's compatible with your software and hardware infrastructure and is endorsed by leading systems, software and channel partners. To learn more about how the SDLT 320 races away from the competition, go to 320reasons.com.

Enter Bluefin

Bluefin is the SNIA's project name for a vendor-neutral API specification (plugs and sockets) that can be built into networked storage devices and management applications. Bluefin starts with the DMTF's WBEM, an existing, accepted and published set of standards for the management of multiple disparate devices residing on an enterprise computing network. The WBEM "pyramid" is supported by three open standards:

- CIM
- xmlCIM, an XML coding specification created specifically for CIM
- HTTP, which is used as a transport mechanism to enable open, interoperable communications between management applications and managed devices that conform to the CIM specification.

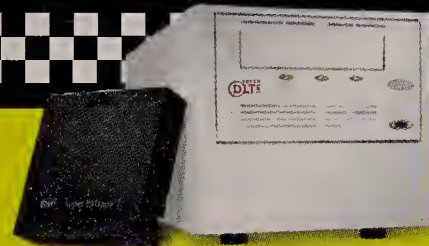
The creators of Bluefin have adapted the WBEM architecture to the networked storage environment. In its first iteration, Bluefin will support a number of essential SAN management functions in an open, device-neutral way:

- **Discovery.** The automatic identification and registration of devices (HBAs, switches, arrays and tape drives) that exist on a SAN, both at the time of startup and as devices are added to the SAN.
- **Monitoring.** A continuous observation by a management application of SAN fabric health and the operation of each device within a SAN.
- **Security.** The protection of data in a SAN from corruption or loss.
- **Device management.** The active control, configuration, and reconfiguration of SAN-attached devices.

While individual device control can be performed manually now by IT administrators, one of the goals of Bluefin is to enable the automated management of a heterogeneous SAN fabric (devices from any vendor and interconnects) by a management application. And while IT administrators can manage individual devices now through a variety of different interfaces, another goal of Bluefin is to establish a Web-based interface that is common to all devices within a SAN fabric.

SNMP has been used (and continues to be used) as a common method for allowing a heterogeneous collection of devices on a SAN to communicate with a management

SDLT 320: THE ULTIMATE BACKUP MACHINE.



LARGEST CAPACITY

320 GB – 60% more than the nearest competitor!*

HIGHEST PERFORMANCE

32 MB/s – Up to 33% faster!*

LOWEST COST PER GB

Up to 46% lower!*

PROTECTS YOUR INVESTMENT

Backward compatible to DLTtape™ IV media

IDEAL FOR AUTOMATION

Best combination of storage density, performance and durability

BROADEST PLATFORM ACCEPTANCE

Over 2 million drives and 80 million cartridges sold

INDUSTRY-LEADING ROADMAP

First with a path to over one terabyte and 100 MB/s*



See for yourself why the SDLT 320 is the highest performing drive on the road today!

Go to 320reasons.com.



*When compared to LTO 1, AIT 3 and Mammoth 2 drives. Where mentioned, capacities and transfer rates are compressed.

©2002 Quantum Corporation. All rights reserved. Super DLTtape and DLTtape are trademarks and the Super DLTtape logo is a registered trademark of Quantum Corporation.

application. SNMP is typically used for device discovery and device status monitoring. However, it cannot support other critical management functions, such as dynamic control and configuration — essential requirements for the automated management of a storage fabric.

The anatomy of Bluefin

At a very basic, simplified level, Bluefin entities are divided into two categories: consumers and producers. Consumers are management software applications that could reside virtually anywhere within a network provided they have a physical link either within the data path or outside the data path to producers (the data link planned for the first release of Bluefin is IP, but it could also be Fibre Channel, SCSI, ATM, InfiniBand or others).

Producers are the devices under management within a storage fabric. Consumers can be host-based management applications (SRM), enterprise management applications (frameworks) or SAN appliance-based management applications (virtualization engines). Producers can be disk arrays, HBAs, switches, tape drives, etc.

Producers communicate with consumers via agents that perform a number of functions:

- Act as a repository for information about a specific device.
- Enable the discovery of the device by management applications.
- Communicate events and perform status monitoring.
- Enable interoperable configuration and control.

The Bluefin model also describes two additional entities: Object Managers and Lock Managers. Object Managers can be used as extensible agents by aggregating multiple devices under the control of a single agent. Object Managers can also be used as persistent repositories for information regarding multiple devices.

Lock Managers allow multiple consumers to concurrently communicate with a single producer. The Lock Manager reserves a producer-associated agent at a given moment in time so that a particular consumer can perform an operation (that is, a query or command). The Lock Manager then releases the agent to another consumer.

It's important to note that IT administrators will not have to go around tearing out and replacing storage infrastructure in order to take advantage of Bluefin. The creators of Bluefin have also included the ability for vendors to define proxy agents that can essentially be bolted onto non-Bluefin-enabled consumers and providers.

The Bluefin value proposition

Right now, Bluefin is all about accelerating the acceptance of SANs. Surveys of enterprise IT storage users consistently show that there are three basic inhibitors to future SAN growth:

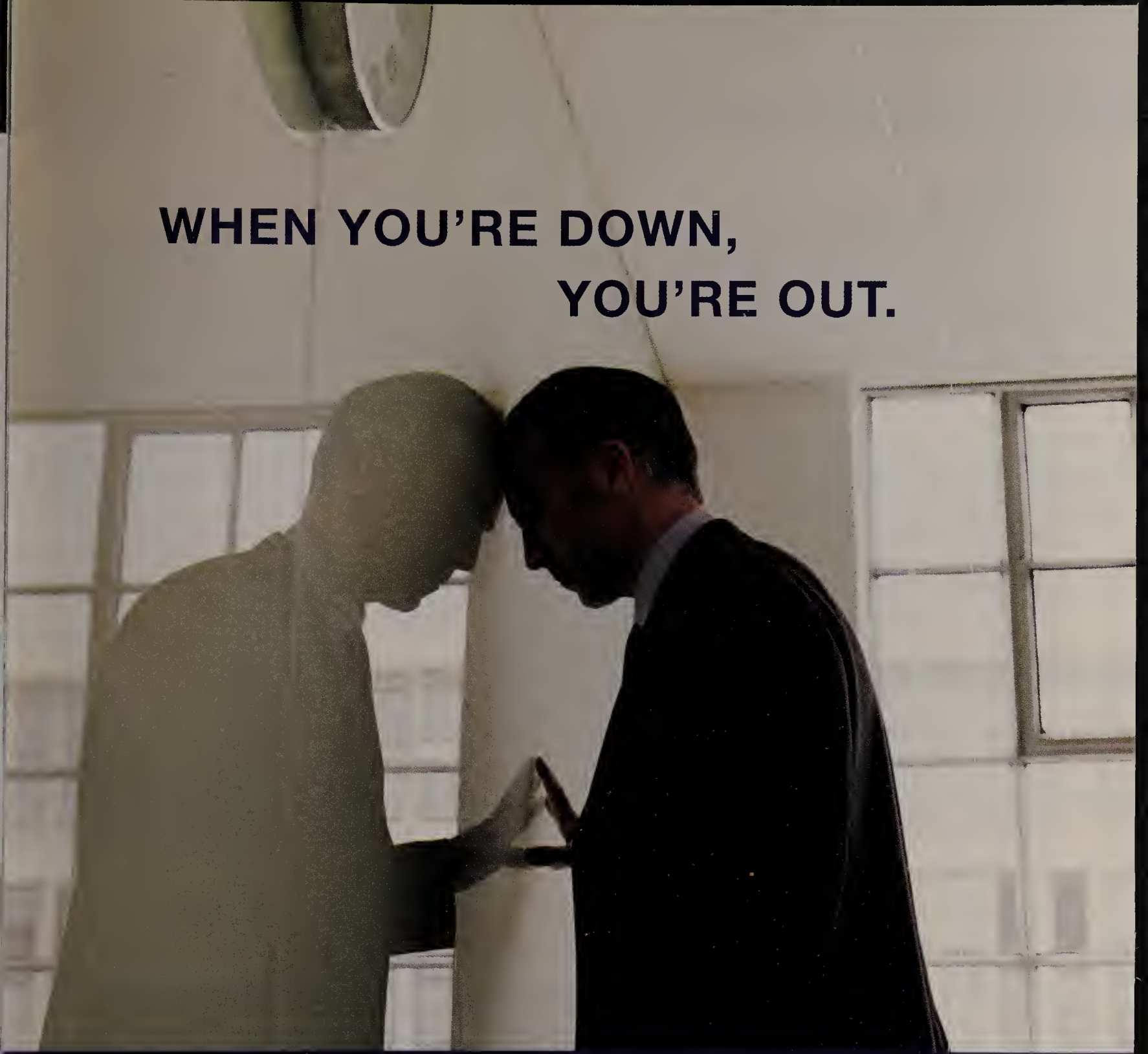
- **The inability to manage a SAN fabric as a single entity.** SANs are perceived by many to be collections of devices performing different functions within a SAN, interconnected physically to form a fabric, but with no common software application that manages the network as a fabric. Instead, many users who believe that manageability is a key feature when considering a SAN implementation project see a collection of vendor-specific and device-specific management tools that are only loosely integrated, if at all.

- **The security of data may be at greater risk when data is stored in a SAN environment.** Many users, both in IT and at the departmental user level, question SAN security. They worry about the exposure of data to intrusion, or corruption due to malfunction or administrative error.

COMPUTERWORLD CUSTOM PUBLISHING

This White Paper was created by Computerworld's Custom Publishing group. Questions or comments on this supplement can be sent to Carolyn Medeiros at carolyn_medeiros@computerworld.com.

This White Paper, like other custom supplements, can be viewed online at www.computerworld.com.



**WHEN YOU'RE DOWN,
YOU'RE OUT.**

**Network Appliance makes backup and recovery
simple... and faster than ever before.**

The NetApp® NearStore™ solution works with your existing backup infrastructure to provide easier backup and faster recovery of your business-critical information. All at a total cost of ownership that will astound you.

Now more than ever, your business relies on information access and protection. You can rely on Network Appliance to deliver the nearline storage solution that will keep your network up and running.

Find out how NearStore is making business continuance simple. Visit www.netapp.com/fast/recovery

© 2002 Network Appliance, Inc. All rights reserved. NetApp and the Network Appliance logo are registered trademarks and Network Appliance, NearStore, and The evolution of storage are trademarks of Network Appliance, Inc., in the U.S. and other countries.


Network Appliance®
The evolution of storage.™

Departmental users sometimes worry that they won't get an accurate accounting of the resources they're using and are being charged for when data is stored in a SAN.

- **SANs simply cost too much.** In spite of massive publicity, user testimonials and ROI studies to the contrary, SANs are still often perceived as too costly an investment right now. High perceived SAN costs are one of the reasons the network-attached storage (NAS) alternative is presently seeing accelerated growth among users wanting to move away from DAS environments. For them, SANs are more costly to implement, more costly to support and require specialized training — making them more costly to manage.

Vendors rallying around Bluefin propose to remove each of these barriers to adoption in the following ways:

Managing the SAN as a fabric

The promise of Bluefin is the intelligent storage fabric. The state of the industry today is such that we can have intelligent, self-managing devices embedded in a SAN fabric, but we do not have SAN fabrics in which any device can be managed in concert with any other device. If storage device and management software vendors adopt and build products that conform to the Bluefin specification, many things are possible:

- The ability to manage all devices on a SAN with a single, consistent, Web-based user interface.

- The ability to add devices to a SAN in plug-and-play fashion means administrators can continue to scale the storage infrastructure as well as

add diverse technologies without breaking the existing storage management framework that was established and implemented.

- The ability to step beyond passively monitoring a SAN to an environment where devices can be actively controlled and configured by automated management agents.

- Further integration of SAN management functions with enterprise management frameworks such as CA Unicenter, HP OpenView, and Tivoli beyond that which can be accomplished using SNMP.

- Adaptation of existing SAN infrastructures with new Bluefin-compliant devices and management applications.

- The ability to manage FC SANs and IP SANs with the same management application.

Addressing the cost conundrum

Bluefin promises to reduce SAN costs both directly and indirectly. Providing an open-standard API model reduces management applica-

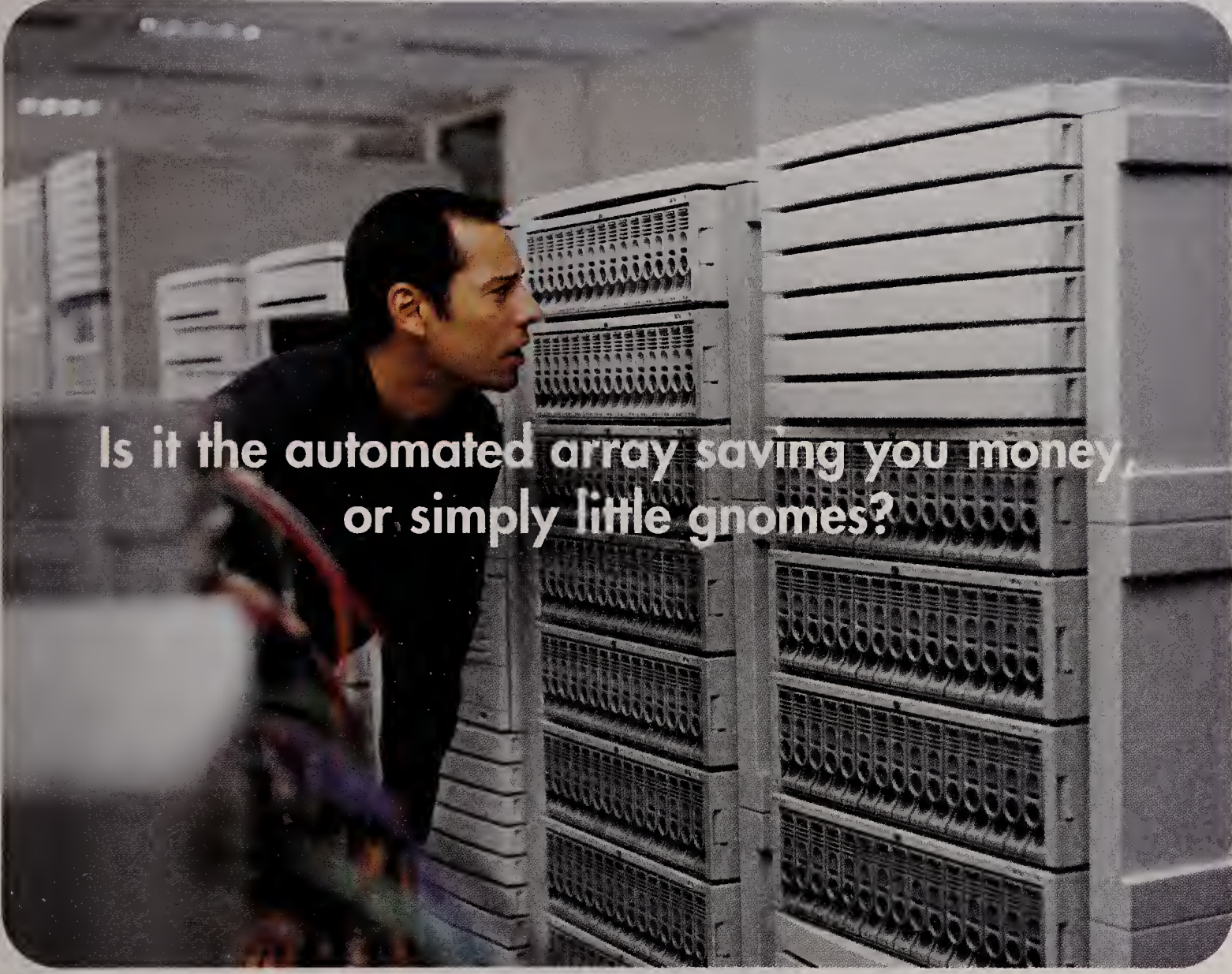
tion development costs. Management software vendors are relieved of the significant financial burden resulting from sourcing, adapting and supporting a collection of proprietary APIs. The reduction in development and support costs can be passed on directly to enterprise IT buyers.

Bluefin also promises to greatly reduce the storage management burden weighing down enterprise IT administrators — a burden that, for many, gets heavier with each passing day as more data accumulates within databases, more e-mails are added to e-mail folders, and more Web-facing applications are brought online. In short, an intelligent storage fabric allows enterprise IT to manage more data with less staff.

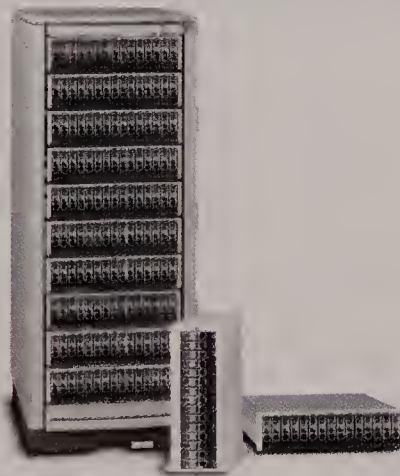
Adoption by the storage industry of Bluefin technology could also result in a "knock-on" reduction in SAN costs. It's no secret that vendors are trying to accelerate SAN penetration within enterprise IT. While large enterprises have been the primary SAN adopters, small to medium-size

John Webster is Senior Analyst and Founder of Data Mobility Group. Prior to starting DMG, he was a Senior Analyst and IT Advisor at Illuminata Inc., where he founded and developed Illuminata's storage-related market research and analysis practice. Mr. Webster is the author of numerous articles and white papers. He contributes regularly to InfoStor Magazine and SNW Online and is often quoted in business and trade publications. Mr. Webster has also been a featured speaker at Storage Networking World and StorageManagement 2002.

In addition, Mr. Webster has held the positions of Vice President, Marketing for Storage Computer Corp.; Director of Computing Research with Yankee Group's Management Strategies Planning Service; and Senior Analyst with Clipper Group and International Data Corp. He is Chairman of the Greater Boston Regional Computer Measurement Group and serves as liaison to the SNIA's Consumer Executive Council. He is a graduate of Boston University.

A man in a dark shirt is looking intently at a large, multi-tiered server rack in a data center. The rack is filled with numerous server units, each with many ports and cables. The background shows other server racks and the industrial setting of a data center.

Is it the automated array saving you money,
or simply little gnomes?



It's the automated array and all of its cost-saving features. HP's Virtual Arrays save you money by automating the manual processes required in traditional arrays. Tuning out hot spots, adding storage space and protecting your data—automatically. Freeing your valuable IT resources and taking the mystery out of efficient data management.

**[Hurry, and request your free copy of the
HP Virtual Array: Double Your Operating Efficiency guide
now, visit www.hp.com/info/virtualarray]**



shops represent a huge untapped opportunity for SAN vendors.

By reducing if not eliminating barriers to SAN adoption, Bluefin makes SANs significantly easier for small- to medium-scale IT shops to deploy and support over time. It's simple: more SANs yield more SAN ubiquity. More SAN ubiquity yields higher SAN component volumes yielding, in turn, lower costs for individual SAN components. Bluefin helps SANs become mainstream.

Storage's Bluefin future

To date, the SNIA has produced the first version of the Bluefin specification. Additionally, working groups have adapted the specification to specific product sets. But producing a written specification is only the first step. Vendors must then translate the specification to their own products. Then testing is needed among devices and management applications to ensure stable interoperability.

The forum for interoperability testing within the storage industry is called the "plug-fest." The first Bluefin plug-fest occurred in July. There will be a comprehensive demonstration of Bluefin technology at the Fall 2002 Storage Networking World conference in Orlando, Fla.

The SNIA has developed generic Bluefin APIs, called object model profiles, for disk arrays, FC switches, HBAs, management applications, tape drives and virtualization appliances. Vendors of these products can now incorporate those APIs into their product sets. If this year's plug-fests produce favorable results, the industry will start seeing Bluefin-compli-

Vendors currently contributing technology and staff to the Bluefin initiative within the SNIA include:

BMC Software Inc.
Brocade Communications Systems Inc.
Computer Associates International Inc.
Dell Computer Corp.
EMC Corp.
Emulex Corp.
Gadzoox Networks Inc.
Hewlett Packard Co.
Hitachi Ltd.
IBM
JNI Corp.
Prisa Networks Inc.
QLogic Corp.
StorageTek
Sun Microsystems Inc.
Veritas Software Corp.

ant devices and SAN management applications by early 2003. The next order of business will be to extend the Bluefin specification to policy management, NAS and iSCSI.

A very different future worth contemplating by the proponents of Bluefin is the concept of endowing user applications with more storage awareness. IT administrators could greatly benefit from storage management know-how built into user applications as well as management applications themselves. Each application comes with its own storage administrator. For those used to the idea that storage sits at the bottom of the processing totem pole, user appli-

cations sit on top and everything else sits in between, the concept of applications-managed storage may sound a bit absurd. Nevertheless, applications-managed storage is closer to becoming real now that Bluefin is real. Bluefin makes it possible for the developers of database applications, for example, to look down into the storage domain and see an openly published set of management interfaces that can be used as hooks into a storage fabric. Said another way, the developer "sees" a storage fabric as a single, manageable entity.

Conclusion

The storage industry is rightly watching the adaptation of WBEM/CIM to storage networking with a skeptical eye. Yet there's a realization among vendors that the time for WBEM/CIM is now. The SAN penetration rate is slowing; something has to be done to reestablish momentum. If storage vendors can unite, Bluefin will move off the pages of the specification sheet and into IT shops by early next year.

There are indications that consensus has been found among storage vendors, that a sense of urgency has been stimulated. Ironically, a dominant vendor had much to do with igniting the WBEM/CIM fire by, earlier this year, offering its own comprehensive management platform complete with APIs for the management of heterogeneous SANs. Sixteen storage vendors are now committing development dollars and engineering staff to Bluefin. Progress will come, and sooner than skeptics would have us believe. ♦

And now, a few words about data back up:

For the tech crowd:

BrightStor™ Storage Software

Mare. Mare. And now. These are the words most frequently associated with storage needs. The explosion in web activity, the perpetually increasing number of applications coming out that require larger databases and the spiraling complexity of enterprise storage solutions has increased the demand for immediate solutions to growing storage problems.

That's why there's BrightStar from Computer Associates (CA). The most comprehensive family of storage solutions on the market, BrightStar solutions are completely and totally open. Which means that unlike most vendors, who are focused solely on their individual solutions, BrightStar brings multi-vendor systems and the environment together seamlessly.

What does this mean for you? It means optimization of resources across all platforms and storage types. It means a greater understanding of your storage resources and how to best allocate them to fit your needs. And it means a lower total cost of ownership.

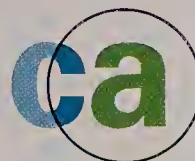
Specifically, BrightStar provides you with unparalleled data protection, real-time data availability, and the ability to view, manage, and monitor your resources from a central location. And BrightStar is the only software of its kind that incorporates CA's patent technology—the leading patent solution on the market.

Why rely on Computer Associates? Because we're a completely independent software company with over 25 years of experience. That's how we got to be the software management experts. And that's why 99% of the Fortune 500® rely on our software.

We know that storage is no longer just backing up what you already have. It's facilitating integration with every aspect of your entire eBusiness. It's leveraging all of your existing capabilities to maximize your resources enterprise-wide. And, most important, it's using what you have to find future opportunities and capitalize on them.

For everybody else:

Reliable = Good.
Unreliable = Bad.



Computer Associates™

Q&A: An interview with SNIA's Mark Carlson

Mark Carlson, a storage architect for Sun Microsystems Inc., has labored behind the scenes for five years within the SNIA to promote Common Interface Model (CIM) development and adoption — often with limited (at best) vendor support.

Jon Toigo recently sat down with Carlson to discuss the status and vision of CIM/WBEM.

Q: Reading technical materials on CIM/WBEM, or attending presentations on the subject, can get confusing. Can you define what this alphabet soup nomenclature means?

Carlson: Every storage device and storage software product can be modeled as to how it operates and how it can be controlled. Even for a given type of product, each vendor implements its product in a slightly different manner. In order to achieve interoperable management, we need an abstracted model of arrays that works for any of these vendor models while also allowing the management of the individual differences.

CIM is the standard that provides both the common, abstracted model and the ability to extend this base model to allow each vendor to take advantage of its own added value. It's a standard from the Distributed Management Task Force [DMTF] as part of the Web-Based Enterprise Management [WBEM] initiative.

Q: How is CIM different from proprietary agent-based management frameworks like SNMP?

Carlson: CIM is object oriented and models more than just configuration and monitoring information, which is what SNMP does. It includes the modeling of relationships between storage resources — so you can, for example, find out which application is using which storage devices — and it models the controls on resources.

Q: Is CIM only for the management of SAN-based storage?

Carlson: A lot of the emphasis has recently concentrated on getting enough models in place to manage a SAN, but CIM is now being extended to cover additional areas such as NAS and IP-based storage. The CIM schema also has models for systems and network-based management.

Q: Is it limited to server-centric storage management?

Carlson: CIM has historically required a host-based CIMOM for implementation. Vendors are now looking at what's required to embed CIM capabilities directly in their storage devices, moving CIM into more of a network-oriented implementation.

Q: What, if any, storage devices are currently instrumented for management via CIM?

Carlson: Most of the existing CIM implementations are shipping with host operating systems such as Solaris and Windows. CIM support will typically be made available for download from vendor Web sites.

Q: What's the near-term outlook for CIM-based management implementation on HBAs, SAN switches, storage arrays, and so on?

Carlson: Most likely, support will start to be available for most of these devices this fall. Look for management application releases that start to take advantage of this CIM support early next year.

Q: What's the relationship between CIM and other industry initiatives like Bluefin?

Carlson: Likely, the SNIA will pick up the Bluefin specification and will publish it as an SNIA specification and standard for vendors to implement. This will ensure broader industry input and adoption.

Q: How much of the current increased interest in CIM is a reaction to proprietary storage management initiatives from EMC and Veritas Software?

Carlson: Proprietary initiatives will need to offer more functionality than just being a common interface for proprietary adapters to plug into, since CIM already does this and is vendor-neutral. If I am a storage device vendor and implementing CIM support not only allows me to claim I am open, but it also enables me to plug into these proprietary frameworks, I win both ways. ♦

PLAN TO ATTEND

The Storage Event that Does it All for IT Users...

STORAGE NETWORKING WORLD®

Co-owned
and Produced by:
COMPUTERWORLD

Co-owned
and Endorsed by:
SNIA

October 27-30, 2002 • Renaissance Orlando Resort • Orlando, Florida



- The original, largest and most proven educational forum for IT users involved in storagenetworking, enterprise infrastructure and data management
- The world's foremost gathering of storage networking industry leaders, luminaries, press and analysts
- The world's most comprehensive Interoperability Lab with 50+ companies working together with demonstration themes complementing the conference content
- Benefit from real-life user case-studies, practical "tips and tools" workshops, the SNIA-produced Technical Tutorial Series, as well as CTO and other informative panels
- A full conference package including primer, tutorials, general sessions, Interoperability Lab, Expo, meals, receptions, gala dinner and golf for IT users



Storage Networking World® Spring 2002 attendees saw solutions from...

PLATINUM SPONSORS



GOLD SPONSORS



CONTRIBUTING SPONSORS



MEDIA SPONSORS



For more information visit **www.snwusa.com** or call **1-800-883-9090**

To sponsor and participate, call Ann Harris at 1-508-820-8667

The

**“UNDISPUTED
HEAVYWEIGHT
CHAMPION IN
STORAGE
VIRTUALIZATION”**

storage software company.

FACT: A leading industry analyst confirms that VERITAS Software owns 79.9% of the storage virtualization market.

veritas.com/storage


VERITAS™

Copyright ©2002 VERITAS Software Corporation. All rights reserved. VERITAS Software and the VERITAS Software logo are trademarks or registered trademarks of VERITAS Software Corporation. All other trademarks are the property of their respective owners.

Software Flaw Puts Multiple Operating Systems at Risk

Hole in protocol leaves wide range of vendors exposed

BY JAIKUMAR VIJAYAN

A security hole in software that's used by numerous technology vendors to transfer data between different systems could allow attackers to run malicious programs or cause denial-of-service problems on unprotected servers, according to warnings issued during the past two weeks.

The vulnerability affects the Unix operating systems sold by companies such as Sun Microsystems Inc. and IBM, as well as Red Hat Inc.'s versions

of Linux and Apple Computer Inc.'s Mac OS X Server software (see box). In addition, Microsoft Corp. and Hewlett-Packard Co. said they're investigating whether their operating systems are at risk.

Developers at MIT said the flaw also affects the widely used Kerberos authentication software, which was developed at MIT and is designed to let end users securely log onto remote systems. A patch is available on the MIT Web site.

"This vulnerability was one that pertained to such a large number of software distributions that we felt it was pertinent to issue an advisory," said Jeff Havrilla, a member of the CERT Coordination Center at

Carnegie Mellon University in Pittsburgh. "The problem is large enough that pretty much every single major operating system vendor has reported being affected by it."

The vulnerability involves a communication protocol that was developed by Sun and is based on its SunRPC remote procedure call technology. The flaw exists in a program function distributed as part of an External Data Representation

(XDR) library that's used by Sun and other vendors to provide platform-independent methods for sending data between disparate systems.

Publicized Last Month

The problem was first publicized by Internet Security Systems Inc. (ISS), an Atlanta-based security software vendor that posted an advisory on its Web site late last month. ISS said it had found Sun Solaris and the open-source FreeBSD and OpenBSD versions of Unix to be vulnerable to the hole.

CERT followed with its advisory last week and broadened the warning to include other vendors, as well as popular applications that are compiled using the flawed library. Those include MIT's Kerberos 5 software, the DMI Service Provider daemon for remote desktop management and the Common Desktop Environment's Calendar Manager service.

According to the security research organization, the vulnerability is caused by an integer overflow in the XDR code that can result in improper memory allocations. Attackers could take advantage of the flaw to cause buffer overflows that would let them execute code on systems, CERT said.

No exploits have been reported so far, Havrilla said. But it won't take long for attackers to develop tools that could let them use the hole and scanning software that looks for vulnerable systems, he added. Until patches become available from vendors, Havrilla said, users can mitigate their exposure by disabling the affected services where possible. ▀

Vendors That Use the XDR Library Code

APPLE: An update to Mac OS X Server that addresses the vulnerability was released Aug. 2. Details can be found at www.info.apple.com/usen/security/security_updates.html.

IBM: Versions 4.3.3 and 5.1.0 of AIX are exposed to the vulnerability. A patch is in the works and should be available "shortly," the company said.

RED HAT: All versions of Red Hat Linux include the affected code. Patches are being developed.

SUN: Versions 2.5.1 through 9 of Solaris are vulnerable, and patches are planned. An alert with more details can be found at <http://sunsolve.sun.com/pub-cgi/retrieve.pl?doc=fsalert%2F46122>.

NIPC Warns of Attacks, but No Impact Felt

Increase in port scans doesn't result in major problems for U.S. Web sites

BY DAN VERTON

The FBI's cybersecurity unit last week warned IT managers in the U.S. to be on the lookout for wide-scale hacking attacks aimed at Web sites and Internet service providers. But no problems were reported in the aftermath of the warning.

The National Infrastructure Protection Center (NIPC), which is based at FBI headquarters in Washington, said in an alert issued last Monday that it had received "credible but nonspecific information" about the possibility of cyberattacks being launched that night. The information came from European officials who indicated that the attacks might be initiated from Western Europe, the NIPC said.

Liffey Network Solutions Inc., a Pleasant Hill, Calif.-based application development and IT outsourcing firm,

said it detected a significant upswing in port scans, which are used by attackers to look for vulnerable systems.

But officials at several other companies said there was no noticeable increase in attacks against Web sites.

For example, Charles Fleckenstein, a spokesman for Sprint Corp., which carries nearly 25% of the world's Internet traffic, said managers at the company's network operations centers "have seen nothing out of the ordinary."

Elad Yoran, executive vice president and co-founder of Riptech Inc. in Alexandria, Va., said the managed security services and consulting firm also didn't notice a substantial rise in overall attack activity following the NIPC's alert.

Riptech monitors hundreds of corporate networks worldwide, as well as the networks

of various Internet service providers. The company is due to be acquired by Cupertino, Calif.-based Symantec Corp. [QuickLink: 31645].

Keynote Systems Inc., which monitors Web site response times and other performance metrics, didn't document any degradation of throughput

on the Internet as a whole, said Roopak Patel, a product manager at the San Mateo, Calif.-based company. Keynote's Internet Health Report showed "relatively normal behavior," Patel said. He credited the enhanced sophistication of most Internet service providers when it comes to defending their servers against attacks, as well as their ability to take preemptive measures to stop such attacks before significant performance problems occur. ▀

ON THE ALERT

For more coverage of IT security issues, head to our Security Knowledge Center.

QuickLink: k1600
www.computerworld.com

IT SECURITY

BRIEFS

Peregrine Sells Off Two Software Units

Peregrine Systems Inc. in San Diego sold its transportation asset management and facility management software units for a total of \$12.5 million. The transportation technology was acquired by Maximus Inc. in Reston, Va., and the facility software was bought by Tririga Inc. in Las Vegas. Peregrine is restructuring after discovering accounting irregularities [QuickLink: 30617].

Oracle to Upgrade Small-Business Apps

Oracle Corp.'s Web-based small-business applications are due to be upgraded in October with new features such as automated marketing software. But a European launch of the Oracle Small Business Suite has been postponed until early next year. The software is developed for Oracle by San Mateo, Calif.-based NetLedger Inc., which is majority-owned by Oracle CEO Larry Ellison.

NEC Unit Offers 'Green' Desktop PC

Santa Clara, Calif.-based NEC Solutions Inc. announced a "green" PC with environmentally friendly features such as a motherboard made with lead-free solder. The PowerMate Eco uses a 900-MHz Crusoe processor from Transmeta Corp. and starts at \$1,599. Its release comes as Congress is considering a bill that would impose a recycling fee on PC sales [QuickLink: 31816].

Short Takes

IT spending by North American companies will likely increase by an average of 2.3% this year, according to a survey of 1,001 corporate executives by **FORRESTER RESEARCH INC.** in Cambridge, Mass. . . . The **EUROPEAN COMMISSION** approved a deal under which **HITACHI LTD.** is buying majority ownership of **IBM's** disk drive business for \$2 billion.

MARYFRAN JOHNSON

Penguin Momentum

WHENEVER PEOPLE step into my office, they instantly assume I'm a Linux devotee. Given the rather embarrassing number of stuffed penguins I have scattered about (although nowhere near the 17 endearing species existing worldwide), it's an understandable leap of logic.

In all honesty, I wouldn't know a Linux system command if it hopped up to me, preened its feathers and honked hello. But I'm sure that Tux, the Linux mascot, would forgive my technical shortcomings. He would probably just feel sorry for someone still using Windows 98.

Which brings me to next week's LinuxWorld show in San Francisco, and the noteworthy fact that Microsoft will be there with its very own booth. As a company official said in reporter Carol Sliwa's Page One story this week, the company views even the Linux faithful as potential customers. (You have to marvel at their nerve.)

The software maker will be demonstrating its \$99 Services for Unix product, which enables Unix and Linux applications to run on top of Windows.

Also paying serious attention to the Linux crowd will be Unix powerhouse Sun Microsystems, which is expected to announce its controversial Linux server, a dual-processor system running Sun Linux on an Intel platform.

Now, it's probably too much to hope for (from a media point of view) that there will be open hostilities or fisticuffs at the Microsoft booth over freely available software vs. monopoly power. But the software giant's presence is a not-so-subtle acknowledgment of how significant a competitive concern Linux has finally become.

"It's probably the biggest threat to Microsoft since its inception, because we're dealing with a phenome-



MARYFRAN JOHNSON is editor in chief of *Computerworld*. You can contact her at maryfran_johnson@computerworld.com.

non that has roots now in many enterprises," says Gartner analyst George Weiss. Gartner estimates that the \$3.4 billion being spent by corporations on Linux systems this year will triple by 2005.

The sheer momentum of the 12-year-old free source-code operating system has finally propelled it into mainstream awareness. "Linux Wad-

dles from Obscurity to the Big Time" was the business cover story headline in *USA Today* last Monday, accompanied by a graphic showing a herd of Tuxes. The lead anecdote detailed the massive savings — and performance boosts — enjoyed by investment bank Dresdner Kleinwort Wasserstein when it switched from Unix to Linux.

That combination of cost savings and increasingly credible capabilities is an especially compelling story in today's economic climate. Although

the wobbly economics of companies trying to make a living on Linux by adding applications and support probably aren't causing Bill Gates to lose much sleep.

"The Linux operating system market, from a revenue perspective, accounts for one half of 1% of the total operating system revenue each year, or roughly two days' worth of Microsoft's operating system revenue," notes Al Gillen, an analyst at IDC.

Still, IDC and other analyst firms remain bullish on the growth potential for Linux market share. And Linux's powerful friends far outnumber its enemies. A resurgent IBM is clearly leveraging Linux as a central part of its competitive strategy against Microsoft and Sun. And Intel is pushing hard on Linux to drive adoption of its lineup of Pentium, Xeon and Itanium processors. Oracle is another big supporter, with some 91,000 copies of Oracle9i for Linux already downloaded from its Web site.

But what will really make 2003 "The Year of the Penguin" are the corporate users propelling this one-time cult operating system into the heart of the enterprise — saving money, scaling up and sidestepping vendor lock-in. It couldn't happen to a more deserving bird. ▀

PIMM FOX

Site Testing Clears Up IT Changes

RETAILER REI offers a variety of clothes and equipment for the great outdoors. But the company can't predict the weather for each of its 60 retail outlets to know with certainty if, say, its Pacific Northwest stores will need more or less rain gear as the wet season draws near.

REI's online operation is similar: It contains many contingencies for customer interaction but can't predict specific problems until they appear.

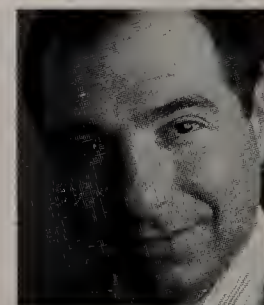
One salve may come in the form of site-testing software that monitors page times, records transaction histories and simulates customer interaction.

REI.com runs 37 machines with Java engines, IBM's Commerce Suite and Oracle9i at its Sumner, Wash., data center. Rod Ketchum, system architect for REI's online operations, says bottom-line considerations are uppermost in people's minds, which makes it critical to assure that this Web infrastructure provides the right environment for credit-card-toting site visitors.

One way to get metrics on "user experience" is to monitor site performance around the world. REI uses software from Keynote Systems to record actual transactions, which include the address page and the receipt page, rather than just a test.

"When you deal with cookies, it is difficult to mimic scripts," said Ketchum, describing one of the features of Web Site Perspective and Transaction Perspective from Keynote. Purchase times are logged and compared with internal benchmarks as well as purchases made on different days.

Without a monitoring tool, these details would be missing from REI's site analysis.



PIMM FOX is a freelance writer in San Francisco. Contact him at pimmfox@pacbell.net.



For more columnists and links to archives of previous columns, go to

computerworld.com/columns

"It is difficult to know exactly what is happening, because you're hitting the database so much," says Ketchum. "This way, software lets us know if it is failing, or if it [the Internet] is slow in a particular part of the country."

Ketchum likes the instant diagnosis screen where you enter a URL and get the response times from any Internet location. Whenever REI builds a page with something new, Ketchum runs it through the software to test it against previous page response times. The goal is to know beforehand what effects new development will have on the entire site and still maintain REI's two-second loading threshold.

Ketchum, who was the online operation's first employee six years ago, is happy with the overall results. But it seems the work is never done.

"Now we need to do spot-checks on different parts of the site while it's running," he says.

Although the monitoring work hasn't helped the company predict the weather, it has helped it predict user experience of its Web site. ▀

DAVID MOSCHELLA IBM Could Lose With Services

SUCH ARE THE vagaries of leadership. In the fall of 2000, the anticipated acquisition of PwC Consulting by Hewlett-Packard never materialized, and Carly Fiorina soon set her sights on a very different target, Compaq Computer. Today, in our much deflated and consolidating times, IBM is picking up PwC for less than half of what HP was once willing to pay.

The result: HP has clearly tied its future to its hardware products, while IBM has gone even farther down the path toward a pure services company.

The general market reaction has been that it's IBM that has the sharper strategic focus, with HP facing a quagmire of integration challenges. While in the short term, this view is hard to argue with, I suspect that a decade from now, we may look back and say that it was HP that was true to its roots, and IBM that lost its way.

As recently as the mid-1990s, IBM

was among the world leaders in systems, storage, displays, printers, semiconductors, desktop computers, and datacom hardware. Yet despite its vast financial and technical resources, the company has been steadily abandoning most of these product businesses, seemingly committed to little other than its proprietary mainframes and minicomputers and a variety of

somewhat isolated software offerings.

This combination of a booming services business and an unprecedented product retreat underscores my mixed feelings about the Lou Gerstner era. Shortly after becoming CEO in 1993, Gerstner rejected the idea of IBM's product groups competing independently, a concept that his predecessor, John Akers, seemed to favor. It was Gerstner's commitment to a more inte-



DAVID MOSCHELLA is an author and independent consultant. Contact him at dmoschella@earthlink.net.

grated IBM (along with strong industry growth) that turned around its then deteriorating financials. But it also marked the beginning of the end of IBM as a broad-based IT hardware supplier.

I think Gerstner gave up on his product businesses a bit too readily. The success of IBM's former printer business, now Lexmark, suggests that IBM could

have had it all — a variety of thriving independent product businesses, as well as today's global services giant. Instead, the company's long-term prospects are now almost totally dependent on the latter, which remains a business of uncertain profitability.

In contrast, while the near-term results of merging HP and Compaq may be disappointing, a decade from now the acquisition will likely be viewed

much more favorably. There will always be a market for computers, printers and other peripheral products, and now HP has no choice but to make these its top priority. Even if Dell remains the market leader, there's always room for a second successful player. Besides, there's no turning back.

From a long-term perspective, it's IBM that faces the more threatening challenges. New CEO Sam Palmisano must prove that IBM really can be a robust, pure services company. Although the services business offers tremendous opportunities, far too much of IBM's current services revenue is directly or indirectly tied to its legacy hardware platforms, which while still highly profitable, will eventually and inevitably fade away. If IBM can make the necessary transition, Gerstner and Palmisano will look like geniuses. If not, IBM's shareholders will surely miss the good old product days. Right now, I'd bet on the latter. ▀

READERS' LETTERS

Access Points to Blame

WIRELESS LANS and other wireless devices are very practical and indeed a necessary technology. Their security problems are a result of the improper isolation of systems ["Pentagon to Order Wireless Disconnect," QuickLink: 3I894]. Access points, not security/encryption, are what make networks vulnerable. It seems like we are relying on the industry to solve a problem of security by software, when in fact all we need are physical security measures. If there is no contact between networks, then there is no chance of data contamination or compromise. This has been a threat since the beginning of networked computing; the only difference is the form of access. It is a matter of education and taking action.

Manuel Xavier Lugo
Athens, Ga.

Work Is for Working

I READ WITH GREAT interest the article in the July 29 issue by "Vince Tuesday" regarding personal use of the

Internet on company time [QuickLink: 3I418]. I remember a time when people went to work to work. As technology and computing have become more entwined into job functions, some employees think they have a license to goof off. This is sad. However, I believe we need to quit viewing this as a technology problem and place it in the realm of psychology, where it belongs. After all, it's a behavior problem that we're dealing with when employees would rather view pornography on company time than do their jobs.

Mike Matull
Director of IT
The Coalition of Orange County Community Clinics
Santa Ana, Calif.

Skills Needed for Survival

AS AN EXPERIENCED IT manager and network engineer currently in the market for a job, I'm finding that about 80% of the positions either include certifications (mainly MCSE and CCNA/CCIE, some CNE) in the "skills required" listing, or ads flatly state that employers won't even look

at résumés without certifications ["Standing Out From the Crowd," QuickLink: 3I351]. I'm also finding that HR departments are too often the initial screeners, and if they don't see the magic letters, no amount of skill or experience helps. So despite what I might feel about certifications, the market is demanding them. I'm working through the self-study route successfully while looking, but I wish I had made the time earlier.

Ben W. Sevier
San Diego

Hackers, Not IT, to Blame

I SUPPOSE THESE cyber-thugs never leave their self-contained, subterranean bunkers and instead stand 24-hour armed watch ["Corporate America Is Lazy, Say Hackers," QuickLink: 3I487]. After all, the typical dwelling has a multitude of known vulnerabilities that lazy householders have failed to address, and appearing in public is an open invitation to a mugging, or worse. These hackers must grow all their own food hydroponically, since all kinds

of pathogens and toxins can be easily introduced into the public food supply. The literature includes numerous methodologies for atmospheric propagation of malevolent gases and aerosols, so these folks must have closed-cycle air systems, unlike the rest of us, who foolishly expect the air to be breathable. The notion that simply because it's possible to perform destructive acts, it's somehow the victim's responsibility is the height of criminal sociopathy. We used to call such malefactors psychopaths and consider them well deserving of indefinite incarceration.

Mark Dengler
Berkeley, Calif.

COMPUTERWORLD welcomes comments from its readers. Letters will be edited for brevity and clarity. They should be addressed to Jamie Eckle, letters editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax: (508) 879-4843. Internet: letters@computerworld.com. Include an address and phone number for immediate verification.

For more current letters on these and other topics, go online to computerworld.com/letters



How can you increase customer profitability?

Identify (and keep) your most valuable customers?

And get greater ROI from your marketing campaigns?

SAS® is all you need to know.

Only SAS provides you with a complete view of your customers. So you'll understand their needs, enhance their lifetime value and achieve greater competitive advantage. To find out how leading companies are reaping the rewards of SAS customer intelligence, call toll free 1 866 270 5723 or visit us at www.sas.com/customer

The Power to Know.™



TECHNOLOGY

THIS WEEK

DEVELOPER'S DILEMMA

OFFICE OPTIONS

A low-cost alternative to Microsoft Office could work for some — but not all — enterprise IT users. *Computerworld* takes a look at the advantages and drawbacks of other options. **PAGE 26**



QUICKSTUDY

IT professionals have demonstrated a propensity for formulating “laws,” both serious, like Moore’s Law, and otherwise, to describe the conditions that govern computing. You can learn more about some of these eternal verities in this week’s tutorial. **PAGE 28**

SECURITY JOURNAL

Security Manager Vince Tuesday investigates how easy it would be to steal money from his company. The answer: difficult, but not impossible. And although he trusts his co-workers, Vince thinks that security improvements are needed.

PAGE 29

NICHOLAS PETRELEY

What's New?

IT'S NICE THAT THE U.S. DEPARTMENT OF JUSTICE recognizes that Microsoft abused its monopoly power. But someone really needs to go after guys like Bill Gates, Steve Ballmer and Jim Allchin for the more heinous crime of voluntary wordslaughter. I'm talking about how they beat the term *innovation* to death. One gets the impression they think they can justify their anticompetitive business practices if they simply learn to mouth the word *innovation* when they belch. But don't worry. I don't know of anyone under the illusion that Microsoft innovation extends beyond the areas of marketing and licensing, so I won't spend any more time torturing that deceased Clydesdale. Instead, I'll whack on the word *innovation* for a while, myself.

I had hoped to dedicate this column to the folks out there doing all the innovating for which Microsoft attempts to grab credit. The bad news is I haven't been able to locate much in the way of technical innovation over the past decade. Java? It's the UCSD P-System revisited. XML is a specialized subset of Standard Generalized Markup Language. Server blades are cool, but what's new about connecting computers on a backplane? The most innovative things about Linux are not technical but philosophical, like how the project grows and improves. Indeed, most open-source software intentionally mimics Windows applications to make the transition easy; therefore you won't find much innovation there.

A handful of window managers take a fresh approach to handling open applications, for example. (Window managers are essentially graphical user interfaces for X11, which you may know as X Windows.) The most unusual, and my personal favorite, is called Ion. You can read about this and other distinctive window managers in a series of articles I wrote for sister IDG publication *LinuxWorld*, starting with “The Desktop Beyond GNOME and KDE” (www.linuxworld.com/site-stories/2002/0709.window.managers.html). But as nice as these window managers may be, they are clearly the exception, not the rule, and few people use them.

Perhaps the grand prize for least innovation in technology over the past decade goes to the PC itself. A reader named Robert made this point quite well in an e-mail response to my column suggesting that game consoles are better computing platforms than PCs [QuickLink: 31552]. I

was talking about the stability of the hardware and APIs, but he drew my attention to the lack of innovation in the PC hardware.

Take, for example, the Nintendo GameCube. There's only one obvious way to plug in a controller, and the controllers plug into the front of a console. Why is that, do you think? Is it possible that's where you intend to use the controllers? Don't we also use keyboards and mice in front of the PC? Or consider the fact that wireless controllers on a GameCube are (gasp!) wireless. The receivers sit right on the GameCube itself. The receiver for my so-called wireless keyboard has a long wire so that I can place the receiver on my desk. And can we finally shoot and stuff the inventors of PS/2 plugs and any other round connectors one has to twist to find the sweet spot for pushing them in? At least you have only a 50% chance of frustration with a USB connector, because the worst you can do is get it upside down where it doesn't fit. But it should be illegal to produce ribbon cables without the tabs that prevent you from plugging

them into your disk drives the wrong way, or to produce a motherboard with connectors that allow you to plug the cables in wrong even when the cable has the tab. I haven't seen the new serial cables for the upcoming high-speed IDE drives, but I hope they won't have this problem.

The bottom line is that there is plenty of room for useful innovation, and some of it requires no more than a two-digit IQ. So I hope key people take the hint and deliver some results over the next decade. I even promise not to complain if Microsoft takes the credit. ►



NICHOLAS PETRELEY is a computer consultant and author in Hayward, Calif. He can be reached at nicholas@petreley.com.

As Microsoft phases out Visual Basic 6, IT developers must make difficult choices on the road to VB .Net.

By Frank Hayes

WHAT ARE WE going to do with all this Visual Basic? If you're a project manager with a portfolio of Visual Basic applications to maintain, that's no idle question. Microsoft's newest version of its flagship programming language, Visual Basic .Net (VB .Net), is a huge leap forward, re-creating Visual Basic as a full-fledged object-oriented programming environment for building full-scale Web services.

But using VB .Net will require re-training Visual Basic programmers to make them full-fledged object-oriented programmers. And for existing Visual Basic code that has been tweaked and adjusted over many years from version to version, VB .Net may signal the end of the line.

BELLE MELLOR

In the long run, keeping those applications going won't be practical: Microsoft will end all support for VB 6 in 2008.

In the short run, corporate software developers have choices to make. They can rewrite those Visual Basic programs in VB .Net. They can choose another .Net language, such as C#, or shift to a non-.Net approach like Java. Or they can bide their time by maintaining the programs with VB 6 — for now.

"There's not a clear need to move applications," says Chris Dial, an analyst at Forrester Research Inc. in Cambridge, Mass. "Microsoft has made it easy to run Visual Basic 6 applications under .Net." That makes the question of when to think about shifting large legacy Visual Basic applications to .Net much murkier, though Dial says it's clearly time to stop building new software with VB 6.

Going for Broke

Zagat Survey LLC in New York decided to jump right into VB .Net with both feet.

"We've been working on this since [VB .Net] Beta 1 about two years ago," says Patrick O'Toole, lead developer. "This" is a completely new version of a large legacy Visual Basic application, rewritten from the ground up with expanded features.

At Zagat, which rates restaurants and hotels, the decision to start early with a complete rewrite in VB .Net was a practical matter. "The existing Visual Basic application was inadequate for the company,"

O'Toole says.

"We kept it running, but the new project replaces it."

O'Toole says becoming familiar with VB .Net's new



VISU NET

frameworks and syntax were a challenge, but online help made that relatively easy to handle. A bigger obstacle for most teams is object-oriented programming.

"Most of my guys were familiar with classes. A couple were pretty object-oriented," he says. For O'Toole, a former C++ programmer, the concepts weren't new, but he doesn't underestimate the challenge for the typical Visual Basic programmer.

Reworking the Code

While the cost of scrapping an existing application and building a new one is substantial, so is just reworking the old code. The cost of a simple rewrite of a client/server application in VB 6 to VB .Net, without adding new features, can run as high as 60% of the original cost of the application, according to Gartner Inc. in Stamford, Conn.

That's because the changes in VB .Net are far more than skin deep. All .Net programming languages use a common runtime framework. As a result, simple Visual Basic operations, such as reading and writing a file, must be reworked to use C++-like semantics.

One advantage to rewriting for VB .Net is that the common runtime all but eliminates "DLL hell," a situation where runtime Dynamic Link Library (DLL) files can be overwritten when new applications are installed, according to Microsoft .Net group product manager David Lazar. And because all .Net features are available, VB .Net removes almost all the limitations of Visual Basic when compared with other languages.

But moving legacy programs to VB .Net isn't trivial, Lazar acknowledges. VB .Net includes an upgrade wizard,

but it's intended to be used as a learning tool; it's not designed to automatically find and convert incompatible code.

The cost of moving applications is part of the reason why Hughes Hubbard & Reed LLP, an 1,100-employee law firm in New York, is taking a gradual approach to shifting its portfolio of Visual Basic applications to VB .Net. Another reason: The ultimate target isn't VB .Net, but C#, says CIO Steve Sommer.

"Our approach is to leave the legacy code running in mixed mode, and then gradually port it — not en masse, but as needed," Sommer says. The price

tag for rewriting the firm's financial, document management and Web applications will be upward of \$3 million. But patching the old code isn't safe or practical.

And six months to a year from now, Sommer plans to end all Visual Basic work at Hughes Hubbard & Reed, shift new development to C# and begin porting old applications as required. In the meantime, it's training time. "Retraining is important, because going to this object-oriented approach — it's terrible to have to do it, but you have to think the way .Net's got to be," he says.

For other IT shops, an important consideration is the mix of applications on the desktop and on the Web. "We do both desktop and Web applications for our agents," says Sam Cooper, a senior programmer at Safeco Corp., an insurance company in Seattle. "The functionality is combined into both."

But the number of Safeco's desktop Visual Basic applications is dropping, and the bulk of the portfolio is now on the Web side. That has led to the com-

Delaying the Inevitable

Not everyone needs to jump on the VB .Net bandwagon right now. And with corporate IT budgets down sharply this year, it's a bad time to launch any projects that aren't certain to pay for themselves quickly — which may extend the life span of VB 6.

"There's a massive investment that was made in VB 6, and IT departments want to wring out the return on that," says Dan Mezick, president of IT training company New Tech USA in North Haven, Conn. "VB 6 isn't broken, and the whole Web services thing is not enough of a reason to switch. Everybody's trained in VB 6. Everybody knows where the warts are. And this is happening at a time when labor is actually pretty cheap for Visual Basic people."

But that won't last, Mezick says. He says he's already seeing strong interest in VB .Net training and expects to see a stampede to .Net by early 2003.

— Frank Hayes

There's a massive investment that was made in VB 6, and IT departments want to wring out the return on that.

DAN MEZICK, PRESIDENT,
NEW TECH USA

pany's strategy: Leave existing Visual Basic desktop applications alone as long as they work; if there's a major change needed, perform an assessment to see if it makes sense to rewrite the application in VB .Net and see what new functionality could be added.

It's on the Web side — where rewriting isn't actually required — where Cooper says he expects to see the most use of the new .Net capabilities. "If there are people we aren't directly connected to, we may want to rewrite to expose things as Web services," he says. But everything will be assessed on a case-by-case basis.

A Little Means a Lot

Some IT departments don't have a large portfolio of Visual Basic applications, but rather just enough code to have to pay attention to the problem. "We only have a little bit in Visual Basic 6," says Neville Teagarden, CIO at Navigant International Inc., a travel management company in Englewood, Colo. "Most of our code is ASP [Active Server Pages] with some Visual Basic embedded in it."

That simplifies the problem for Navigant, which is shifting from Visual Basic and C++ to C# and rewriting code as necessary. But it doesn't eliminate the need for training. "We've sent people through boot camp already, and we're retooling the entire base of developer skills over the next six months," Teagarden says.

But for most corporate IT shops, whether to move to VB .Net is still an open question. There's no immediate requirement to rewrite or convert most legacy Visual Basic applications.

And when to start — and to start training, and for what languages or technologies — will depend on how much value IT stands to gain by moving them. ▀

VISUAL BASIC HITS CROSSROADS

TED'S CUSTOMER



INFRASTRUCTURE WIRELESS PLAY

- 1] e-business is anything but a 9 to 5 desk job. To stay in the game, you need instant access to data wherever you may roam. Get there by integrating wireless into your infrastructure.
- 2] Increase your reach with IBM's global wireless experts, top-notch Business Partners, wireless-enabled ThinkPad® notebooks and WebSphere® Everyplace™ Access software. It's just one of the many end-to-end solutions for real-time information from mother ship to shore.
- 3] For more winning plays, visit ibm.com/e-business

@business is the game. Play to win.™

TED'S DATA



IBM



TED

FEW IT MANAGERS knock the technology inside Microsoft Corp.'s dominant Office suite, but quite a few are considering dumping it in light of recent licensing changes that in many cases increase costs. The question is, Are the alternatives to Office a good fit?

Products like Corel Corp.'s WordPerfect Office and IBM's SmartSuite have long offered competitive upgrades. But the introduction of low-cost options such as gobeProductive (\$124.95) from Portland, Ore.-based start-up Gobe Software Inc. and StarOffice 6.0 (\$75.95) from Sun Microsystems Inc. has some IT managers rethinking their office suite strategies.

These cheaper alternatives have solved many of the compatibility issues that were once barriers to dropping Microsoft's core productivity programs: Word, Excel and PowerPoint.

And while technical hurdles remain between Microsoft Office and competing products, a growing number of IT managers have decided that the company's licensing and pricing policies, coupled with

"good enough" application choices, make now as good a time as any to switch.

The StarOffice Option

Cam Scott, client support analyst for the city of Nanaimo in British Columbia, is currently evaluating how to upgrade 400 desktops running Office 97. He says Microsoft's new licensing policies and the high costs of the software spurred him to look closely at StarOffice 6.0.

The bottom line, Scott says, is that a StarOffice license costs about one-sixth the \$579 cost of Microsoft Office Professional. But even that huge price gap doesn't make it an easy decision, because Microsoft Office's overwhelming control of the productivity software market makes the technical issues pervasive, if subtle.

Tim Brennan, manager of store services at Burlington Coat Factory Corp. in Burlington, N.J., says the retailer has been running Sun's StarOffice 5.2 on 1,500 desktops throughout the company and is considering an upgrade to Version 6 to take advantage of

StarOffice 6.0

Sun Microsystems' recently released StarOffice 6.0, priced at \$75.95, aims to be a mainstream, low-cost alternative to Microsoft's Office XP. But is it a suitable replacement? I came away with mixed feelings.

While StarOffice Writer could open and edit Word documents, there were some inconsistencies and differences in the formatting and viewing options and in auxiliary functions like spell-checking. Some tools, like word count, are missing entirely.

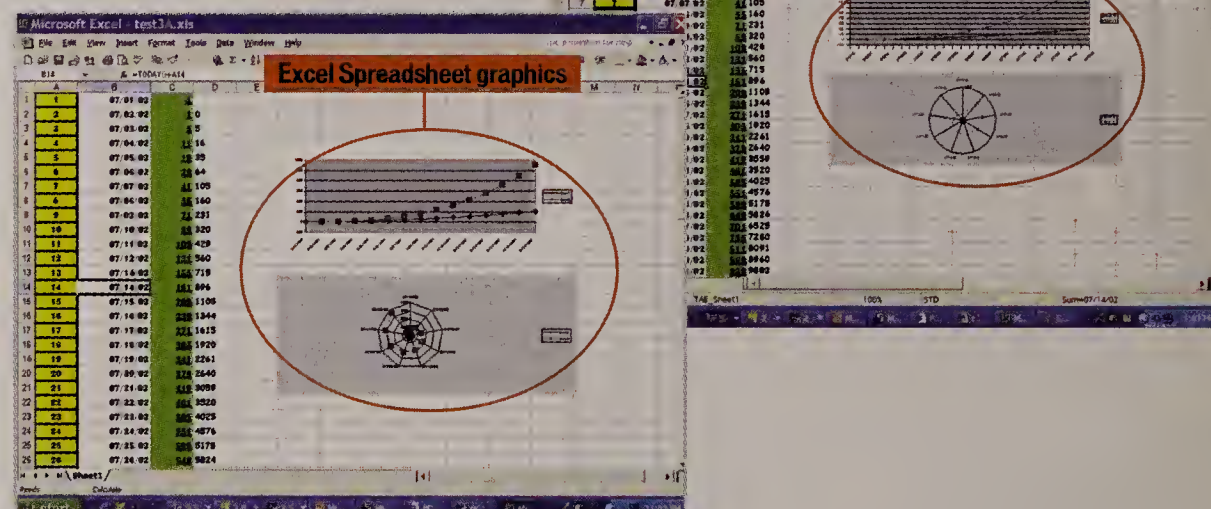
REVIEW

It's much the same with the StarOffice Calc spreadsheet and Impress presentation programs. They opened Excel and PowerPoint files, but not perfectly. With spreadsheets, test charts created in Excel were smaller and oriented differently in StarOffice. For PowerPoint files, not all transitions between slides survived the conversion. And if you're looking for what to do with your old Outlook e-mail and contact files, you need a third-party product like Ximian's Evolution.

Overall, StarOffice 6.0 is neither worse nor better than Office XP, but it is different. And that's likely to be its biggest obstacle to becoming a serious alternative to Office. As with many things, it's not the initial price tag that matters most, but the costs of retraining and continuing support.

— Russell Kay

StarOffice can import data from Microsoft Office applications, but attributes can appear differently. For example, the graphics in the Excel spreadsheet (below) look smaller in StarOffice Calc (right).



StarOffice and other low-cost competitors to Microsoft Office are gaining IT managers' attention. Should you switch? **By Mark Hall**

SuiteDea

its improved compatibility with Microsoft Office.

Version 5.2, Brennan says, is a "resource hog" and suffers when faced with Microsoft Office files that use macros. The user interface can be cumbersome as well, he says, citing the need to use a StarOffice wizard to open an Excel file.

Things have improved greatly in StarOffice 6.0, Brennan says. For example, you can open an Excel file, make changes and save it by default as an Excel document, which isn't the case in 5.2.

But Scott says StarOffice still lacks certain fundamentals. For example, StarOffice's StarBase can't handle the elaborate database applications the city has developed with Microsoft Access 2000. He says he's also disappointed that the software lacks a collaboration program such as Outlook.

The latter issue can be handled by adding Evolution from Boston-based Ximian Inc., says Scott. Evolution is an open-source software product that mimics Outlook's features. But using it means dealing with two companies when productivity software problems arise, Scott notes. The real problem for the city of Nanaimo, according

STAROFFICE REVIEW

For a more complete review of StarOffice 6.0, read the Hands On report online:

QuickLink: 31930

Deciding Factors: Points to consider before making a change:

QuickLink: 31931

www.computerworld.com

to Scott, is dealing with Microsoft Access. He says that about a dozen users require the Access-based applications and won't be able to migrate to StarOffice. That means he'll have to support two application suites. "Not an ideal situation, but workable considering the savings involved," he says.

Training Trade-offs

Switching end users over to a new productivity suite also poses training problems. But it can have benefits, too, according to Dick From, IT manager at Puget Sound Financial Centers.

The Seattle-based financial services firm evaluated StarOffice as a replacement for Microsoft Office but found gobeProductive easier to set up and use.

According to From, "The biggest negative is overcoming resistance to change, though this actually has a silver lining." That's because Puget Sound Financial used the swap as "an excellent opportunity to refresh word processing concepts, with many people learning new things they didn't know were possible irrespective of the word processing product," he says.

From adds that moving from Word to gobeProductive

may be even easier than going from one version of Word to another."

However, the more proficient the user, the more difficult the training becomes. "The learning curve is steeper for people who create advanced spreadsheets, so the jury is still out on this," From says. So while he may need to support Excel for a handful of users, he says, "we're still money ahead."

Training has always been an issue for Microsoft Office's traditional competitors, such as SmartSuite and WordPerfect Office. Powell Smith, SmartSuite offering manager in IBM's Lotus Software Group, acknowledges that full-scale changeovers can last about a year, forcing IT to manage a dual-suite co-existence strategy during that period.

Scott says he doesn't believe that's an issue with StarOffice, because it's designed with Microsoft Office users in mind. "With SmartSuite and WordPerfect, there's a major shift in the way the software behaves," he says.

The overwhelming majority of Microsoft Office users won't be switching to a different application suite anytime soon, however. In part, that's because Microsoft's product may integrate so tightly with other applications that when combined, the software may give a company a competitive advantage (right).

But other factors may prompt users to switch from Office. For example, Brennan says that what sold him on StarOffice was his company's multiplatform strategy. Burlington Coat Factory, which has Windows, Linux and Solaris desktops, has been saddled with using multiple Office suites. StarOffice 6.0, which runs on all three operating systems, will go a long way toward helping him manage the problem, Brennan says.

"The big win for us is cross-platform support in StarOffice," Brennan says. "The cost savings were nice to have." ▀

OFFICE SUITES COMPARED

PRODUCT	PRICE	COMPONENTS	PLATFORMS
StarOffice 6.0 Sun Microsystems Inc. www.sun.com	\$75.95	Word processing, spreadsheet, graphics, presentation, database	Solaris, Linux, Windows
gobeProductive Gobe Software Inc., Portland, Ore. www.gobe.com	\$74.95	Word processing, spreadsheet, graphics, presentation	Windows
OpenOffice.org OpenOffice.org www.openoffice.org	Free	Word processing, spreadsheet, presentation, drawing	Linux, Windows, Mac OS X
Microsoft Office XP Microsoft Corp. www.microsoft.com	\$479-\$579	Word processing, spreadsheet, presentation, database	Windows, Mac OS X*
WordPerfect Office 2002 Corel Corp., Ottawa, Ontario www3.corel.com	\$389-489	Word processing, spreadsheet, presentation, database	Windows
SmartSuite Millennium Edition IBM www.lotus.com	\$224	Word processing, spreadsheet, presentation, database, organizer	Windows, OS/2

* Separate version of Office, V.X for OS X, includes Word, PowerPoint and Excel but not Access.

Microsoft Office's Integration Advantage

Two reasons many IT managers say they'll stick with Microsoft Office: INTEGRATION AND WEB SERVICES SUPPORT

Microsoft Office's dominance isn't just the result of the company's operating system monopoly. Many users say that Office rules because it's ideally suited to the enterprise.

Ken Meidell, CIO at Cascade Design Inc. in Seattle, points to the development project his company recently

did with Office XP integration and the One World enterprise resource planning environment from Denver-based J.D. Edwards & Co. Cascade needed to connect its customer repair database, which runs on SQL 2000, with its overall customer information data source on One World. Meidell says the company looked at third-party approaches but decided that "we could do it faster, cheaper and better with an Excel front end to both systems."

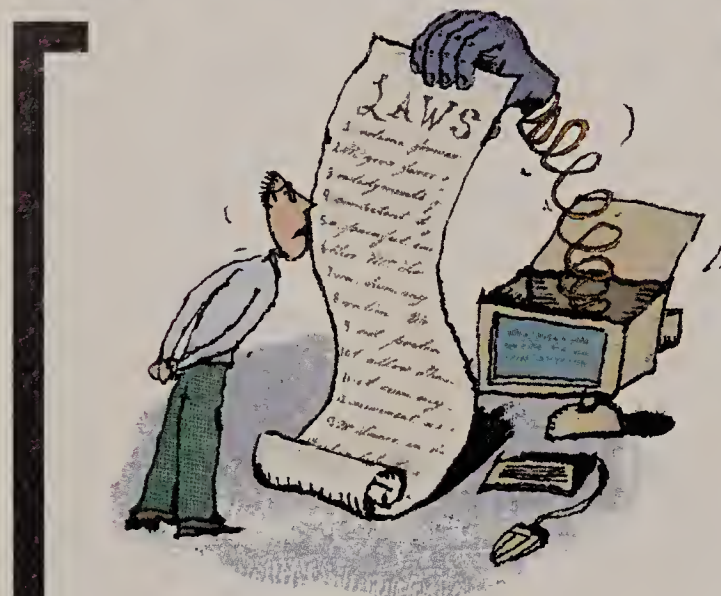
Meidell says Cascade used C# to write Web services calls to the different databases and to update the data appropriately in each one while entering the information only once. The data from the different sources is then brought into a single Excel view.

He says Cascade evaluated StarOffice before upgrading to Office XP but found that the software lacked the integration capabilities it needed.

While StarOffice may steal cost-sensitive customers away from Microsoft, Gartner Inc. analyst Michael Silver says the company's strong technology and integration advantages - and a huge base of third-party support - will ensure Microsoft's continued dominance in office productivity software.

- Mark Hall

It's the Law!



DEFINITION

Almost as long as there have been computers, IT pros have formulated “laws” — serious ones, like Moore’s Law, and otherwise — to describe the conditions that govern computing.

BY RUSSELL KAY

WHEN IT professionals have looked at the possibilities of computing, a number of observations have been made because their underlying truths were so obvious, painful or accurate. This special QuickStudy presents a few of these better-known “laws.” In the companion story (at right), we group many other laws based on the area of computing or type of user they affect. Though one may laugh at most of these observations, the humor in each is derived from a painful kernel of truth.

■ **Moore’s Law** — In 1965, Gordon Moore, at the time a researcher at Fairchild Semiconductor and later a co-founder of Intel Corp., speculated on the future of the microchip. Moore said he expected that

the number of transistors per processor would double every 18 months. This prediction has proved remarkably accurate for nearly 40 years and has come to be known as Moore’s Law. It is sometimes expressed in a slightly different form nowadays: Computing power doubles every 18 months.

Last year, Moore suggested that his law will run up against the laws of physics in 2017. A major factor is the limits of

optical lithography. “We use light to print the patterns of circuits, and we’re reaching a point where the wavelengths are getting into

a range where you can’t build lenses anymore,” Moore said.

In 2007, Intel expects to produce chips using a 0.045-micron process with a gate oxide layer only three atoms thick. It’s hard to imagine many more doublings from there, even with further inno-

vation in insulating materials.

Moore’s optimistic rule of thumb is complemented by a law of despair. In his classic book *The Mythical Man-Month*, IBM project manager Frederick P. Brooks stated that adding programmers to a late project could only make the project later. He formalized this observation in a formula that we now know as:

■ **Brooks’ Law** — The complexity and communication costs of a project rise with the square of the number of developers, while the work done rises only linearly, at best.

For decades, Moore’s law has rescued computer projects that were threatened by Brooks’ Law. However, the success of Linux and other open-source software projects suggests that there may be a loophole in Brooks’ Law:

■ **Linus’ Law** — “Given enough eyeballs, all bugs are shallow,” according to Linux creator Linus Torvalds.

The sheer size of Linux’s distributed development team means that somewhere there is someone who can glance at a module and detect an error that other programmers find elusive. Somewhere there is a programmer for whom fixing such a bug is a simple matter. The more developers there are on the project, the more likely it is that the team will include these programmers. Given enough developers, the existence of one who is exactly the right fellow for the job also approaches certainty.

■ **Murphy’s Law** — Anything that can go wrong will — usually in the worst possible way. ▀

Kay is a freelance writer in Framingham, Mass. Contact him at russkay@charter.net.

Are there technologies or issues you’d like to learn about in QuickStudy? Send your ideas to quickstudy@computerworld.com

To find a complete archive of our QuickStudies, go online to computerworld.com/quickstudies

More Eternal Verities

How Computers Process Math, Time and Money

- Computers always start counting from zero, except sometimes.
- **Grabel’s Law:** Two is not equal to three — not even for very large values of two.
- **Skinner’s Constant:** That factor which, when multiplied by, divided by, added to or subtracted from the answer you got, gives you the answer you should have gotten.
- **Best’s Law:** If data resides in two places, it will be inconsistent.
- **Estimating Time:** Everything takes longer than you think or want. To estimate the time required for any given project, first guess at the time you think it should take; multiply that by 2 and change to the next higher unit of measurement. Thus, if you think you can complete a project in one hour, tell your boss you will need two days; if four weeks, ask for eight months.
- **The 90-90 Rule of Project Scheduling:** The first 90% of the project takes 90% of the time, and the last 10% of the project takes the other 90% of the time.
- When you get a computer to do a job for you, the time you save will usually be spent watching the computer to make sure it works properly.
- No matter how expensive you expect a system to be, it will always end up costing more.

The Futility of Programming

- The computer is always right. Programmers are occasionally right.
- **Gutterson’s Laws:** Any programming project that begins well ends badly. Any programming project that begins badly ends worse.
- **Klienbrunner’s Corollaries:** If a programming task looks easy, it’s tough. If a programming task looks tough, it’s damn-well impossible.
- **Farvour’s Law:** There is always one more bug.
- **Dijkstra’s Observation:** If debugging is the process of removing bugs, then programming must be the process of putting them in.

Hardware

- **Pournelle’s Law:** Cables do matter. When something doesn’t work, always check the cables and their connectors first.
- **Parkinson’s Law of Data:** Data expands to fill the space avail-

able for storage.

- **Atkinson’s Seventh Law of Computing:** All disk drives fill up.
- **Hardware/Software Paradigm:** A program is a device to show up hardware faults; hardware is the equipment used to show up software faults.

The Customer Is Always Wrong

- You can make it foolproof, but you can’t make it damn-fool-proof.
- When a system is designed so that fools can use it, only fools can use it.

The Disconnect Between English and Computers

- Fail-safe systems do. Operating systems don’t. Machine-independent code isn’t.
- Applications don’t apply; facilities don’t facilitate; plug-ins always come factory-fitted with the wrong type of plug.
- The two most abused words in all of computing are *user friendly*.

Self-Evident Observations, Or ‘Why Didn’t I Think of That?’

- **Lansam’s Laws:** Everything depends. Nothing is always. Everything is sometimes.
- **Glasgow’s Third Law:** Quality is not free, but it is cheaper than the alternatives.
- **Atkinson’s Third Law:** If you need to read a computer manual, you can’t. If you can read a computer manual, you don’t need to.
- **Atkinson’s Fourth Law:** There will be one operating system, one programming language and one philosophy of system administration only after there is only one language spoken and one religion practiced on the face of the earth.
- **Glasgow’s Fourth Law:** If you can’t describe it in writing, you can’t build it. If you haven’t described it in writing, don’t try to build it. If it’s so small it doesn’t need documentation, then it doesn’t do anything worthwhile.
- **Laws of Revelation:** The hidden flaw always remains hidden. Nature always sides with the hidden flaw. And the universe is laughing behind your back.

LAW LINKS

Visit our Web site for a list of links to more laws.

QuickLink: 31560
www.computerworld.com

People Form Weak Link In Transaction Security

A security review of internal funds-transfer systems shows that the biggest risk factor is entirely human. By Vince Tuesday

EVERY SECURITY system, in the end, depends on people. Ideally, programs could be written with restricted privileges for operators so they would pose no threat — but I doubt it would work in practice.

I believe our staff is honest, but I'm not sure we can rely on employee inertia to protect us where money is involved. To determine the scope of any potential problems, we recently reviewed our 30 funds-transfer systems.

Fortunately, many of the systems limit the transfer amount, or they're set up in such a way that committing fraud would require a complicated string of collusions with other companies.

In general, I found our controls adequate. Based on the idea of separation of privilege, these systems need at least two staffers working together to move money. However, I did find some disturbing trends.

Our company is always trying to drive down costs and reduce staff. This has led to concentrations of control: A few individuals — who may feel that their jobs are at risk — now handle all funds transfers. It has also left us with audit and control groups that have little experience with fraud. The longer these trends continue, the greater the risk of a disgruntled employee trying to run away with some cash.

I found bigger problems too. I found the passwords needed to complete a transfer for two accounts taped to a monitor. We hope to prevent recur-

rences through staff training.

In addition to checking out each system myself, I had each business and IT team that uses the applications complete a detailed questionnaire about possible frauds. We then ran scenario-based role plays of those schemes.

Only one person in the 30 groups bothered to ask who I was and why I wanted to know

how to defraud the company. I'll have to follow up with advice to all to be less trusting.

An Outside Job

The exposed passwords aside, I believe our systems are reasonably well built. But I wish I could say I had the same confidence in our new business partners. They don't have dedicated security teams; security responsibilities are shared across IT.

I've always been a little worried by companies that do that. It can mean that security is truly integrated into the business process and doesn't need a champion. But it usually means security takes second place to ease of use. Most IT

developers have little knowledge of or interest in security.

My concerns rose to a near panic when one business partner explained a "clever" solution it had invented to address the problem of transferring financial information to and from other companies.

Many companies send encrypted financial data over the Internet using file transfer protocol (FTP), which has little built-in security. FTP uses an unencrypted, plain-text user name and password for authentication that can be detected using a packet-sniffing tool. The password also tends to be hard-coded into applications that perform transfers, making it difficult to change.

I was initially impressed when our partner claimed that it had worked around this issue and could allow the use of FTP without enabling hackers to intercept passwords. Not only that, but the business leader there said he was sure that his staff wouldn't write down passwords and that automated scripts didn't need to be updated. As he described it, I tried to figure out how his company had managed this. Was it using some kind of pass code, like SecureID? Perhaps biometrics from the staff initiating the transfer?

No. It simply left the password blank. Operationally, this gives the company very low overhead, but security? It has about as much security as it has password length — none.

We've tried getting the business leader to see our point of view, but he doesn't understand. "But why would I want to steal from the company? I am a loyal employee," he said.

I tried to raise the idea that other employees might not be so loyal, but he responded, "I know my team; they are good guys. Why would they con-

sider such a thing?"

Clearly, I'm not going to convince him before our companies start exchanging data. We'll have to get his company to contractually take responsibility for any security risks.

Fox in the Henhouse

Being at risk due to an agreed-upon business decision to forgo security controls is one thing, but there are worse problems out there. Recently, I heard a story from someone whose very attempt to prevent fraud enabled it instead.

To ensure that no internal developer could defraud the company, he had each new system checked by expensive external consultants and the source code reviewed in detail. They reported any issues so he could remove the security holes in the live systems.

Did it work? Of course not. Eventually, an auditor uncovered fraud within a funds transfer system — and the security hole that allowed this fraud had been revealed in the original code review report.

How could this happen? The review was sent only to the development system analyst — the perpetrator. He altered the report to remove his pet security bug, fixed everything else and continued to defraud the company.

It couldn't happen here, of course. Then again, perhaps all my questions have given our development teams some ideas. Pardon me while I go check some logs. . . .

This week's journal is written by a real security manager, "Vince Tuesday," whose name and employer have been disguised for obvious reasons. Contact him at vince.tuesday@hushmail.com, or join the discussion in our forum.

QuickLink: a1590

To find a complete archive of our Security Manager's Journals, go online to computerworld.com/secjournal

SECURITY LOG

Hack Your Code

To make sure your code isn't full of gaping holes, you need to get it hacked — in a controlled way. You may want to try the following:

- 1** Pay someone. The buzz is that the L0pht team, which now works for Cambridge, Mass.-based @stake Inc., is the best at taking an application apart.
- 2** Get a tool to check code. However, I don't see how a souped-up search-and-replace will solve any but the most basic security flaws.
- 3** Teach yourself. Several good books are available, including the two below.

— Vince Tuesday

Security Bookshelf

- *Writing Secure Code*, by Michael Howard and David LeBlanc (Microsoft Press, 2001).
- *Building Secure Software*, by John Viega and Gary McGraw (Addison Wesley Professional, 2001).

The most cost-effective way to write secure code is to train your developers to get it right the first time. Both of these titles cover the same ground but go in depth in different areas.

I recommend both, but the edge goes to *Writing Secure Code*, which includes an electronic copy on CD-ROM.

— Vince Tuesday

Symantec Issues Security Suite

Symantec Corp. in Cupertino, Calif., has announced Symantec Client Security, a software suite that integrates the company's desktop firewall, anti-virus and intrusion-detection products. The package gives administrators a central point from which to manage all three applications and provides updates to all of them in a single download.

Symantec Client Security ships this month. Prices start at \$69.90 per PC for 100 PCs.

**SECURITY
MANAGER'S
JOURNAL**

“

Only one person in the 30 groups bothered to ask who I was and why I wanted to know how to defraud the company.



IDC Enterprise ServerVision 2002

Service-Centric Computing: Catch the Next Wave in IT Spending

Explore the realm of the Internet infrastructure hardware ecosystem.

The demand for newer, better, faster, and more flexible solutions that tie in servers with software, storage, and services delivered through a unique channel is becoming a reality. As a result, IT server vendors are promising a service-centric systems infrastructure. At this year's IDC Enterprise ServerVision, join IDC analysts and industry leaders as they explore this new era of computing. Find out which companies will benefit by leading this revolution and which will profit by waiting for their own opportunity to play a major role. Will you be on that list? Do you have what it takes?

Take this opportunity to interact with the players in the server industry and:

- Find out who in the hardware industry has the right solution stack to deliver on this promise
- Examine the software industry's approach to adaptive systems
- Prepare your server platform to meet the emerging criteria for support of Web services
- Explore the challenges that systems management and provisioning startup vendors face
- Discover the profit pools in a service-centric computing value chain
- Learn to build a commercial computing utility platform from the technical grid computing world

... and much more

IDC Enterprise ServerVision 2002

**Service-Centric Computing:
Catch the Next Wave in IT Spending**

September 26, 2002

The Westin, San Francisco Airport

Register Online

www.idc.com/esv02

or Call

800-605-5849 (978-597-0133 outside the United States)



Sponsors:



invent



Partners:

COMPUTERWORLD

HOSTINGTECH
your connection to the hosting industry

THIS WEEK

IT FUELS THE BIG THREE

Consolidation, standardization and simplification are the watchwords

at the Big Three automakers. Read how GM CIO Ralph Szygenda (left) and others are using IT to build and sell cars faster and cheaper.

PAGE 32



DANIEL LEVIN

GETTING THE MOST FROM OUTSOURCING

As outsourcing deals become more complex and unpredictable, the newly created position of outsourcing relationship manager focuses on business results through development discussions and performance feedback with vendors.

PAGE 35

CHOOSING THE BEST SECURITY GUARDS

With thousands of potential security audit events coming at them, IT departments can't possibly sort, prioritize and act on all of them in a timely fashion. Enter the managed security service provider, which helps lighten the load. PAGE 36

CAREER ADVISER

Fran Quittel counsels an IT worker worried about polishing his skills as his company prepares for a merger. She also offers advice to a Web programmer who is considering certification options. PAGE 38

WORKSTYLES

Connie Guerra at the Food and Drug Administration talks about what makes her IT shop unique and how it has changed since Sept. 11. PAGE 38

BART PERKINS

Divide, Conquer, Save

SO MANY SUPPLIERS . . . so little time, money, staff and patience to manage them effectively. Your baseline of IT suppliers identified thousands of vendors [QuickLink: 31023]. But you can't treat them all equally. Don't even try — divide and conquer. The most critical step in segmenting your supplier portfolio is sorting

suppliers into strategic, emerging, boutique and commodity categories. Use these distinctions to identify your key suppliers, and then tailor your supplier management activities accordingly.

Strategic suppliers are critical to the success of your business. You probably spend the most money with these suppliers. Others in this category are suppliers that provide a unique product critical to your infrastructure and suppliers that are also major customers. This last group is included here for purely political reasons. Imagine a major airline and a major hotel chain that use each other's products. Another supplier might be cheaper, but neither of the companies would likely pull out of the arrangement casually.

It's also possible but unlikely that a boutique supplier would be a strategic supplier. (One client's telecom supplier made the strategic list because the firms' CEOs played golf together.) The definition of a strategic supplier will depend on your business. Whatever the criteria, strategic suppliers merit extra attention, which you can give them by doing the following:

- Find ways to help strategic suppliers cut their own costs in return for lowering yours. Share buying forecasts and assign them a single point of contact.
- Make sure their senior management is engaged in the relationship. Get their commitment to be included in problem resolution, and get after-hours contact information in the event of problems.
- Find ways to use their products across the enterprise in exchange for price breaks.
- Ask strategic suppliers for advice. Since they work closely with many levels of your company, they should be aware of ways to reduce your costs and improve service to you and your customers.
- Keep the list small. Fortune 500 companies should target 30 to 40 suppliers.
- Negotiate win-win deals. Don't try to squeeze so much that suppliers can't profit.
- Expect higher levels of service from strategic suppliers. In return, give them preferential treatment, higher volumes and services like fast contract approval. Many

suppliers will improve their service levels to get (or stay) on your strategic list. Review their performances quarterly, and remove suppliers if they don't perform.

Emerging suppliers often aren't critical today but may be positioned to fill gaps in your IT architecture. They may offer a service that you aren't yet ready for, such as wireless, but intend to acquire down the road. Offer to participate in pilot programs, or find other ways to participate in their product development. Use these interactions to communicate future needs, and determine the supplier's ability to fill them.

Boutique suppliers provide a specialized product like computer-aided design or tax software that is critical for a single department or project. These suppliers must be re-evaluated periodically to determine if strategic suppliers can fill their niche.

Commodity suppliers provide IT that can be purchased from multiple sources. Your relationship with these suppliers is based almost exclusively on price, unless they provide superior service. This category provides good opportunities for e-procurement.

In addition to this initial segmentation, your baseline supplier data can be segmented again in several other ways to provide crucial supplier information to groups across your company. These segments include:

- **Financial:** Sorts suppliers by stability, payment, and contract renewal terms.
- **Legal:** Examines contractual obligations, potential liabilities and licensing issues.
- **Architectural planning:** Considers how the supplier aligns with current and future architectures, as well as the supplier's flexibility and adaptability.
- **Technical alternatives:** Considers product uniqueness and substitute technology.

All suppliers aren't created equal. Segmentation provides a prioritized and proactive approach to managing your suppliers. Used consistently, it will improve service levels and relationships with your strategic partners. Get maximum leverage from your supplier management program by effectively managing the suppliers that have the biggest impact on your business.



BART PERKINS, a former CIO at Tricon Global Restaurants Inc. and Dole Food Co., is managing partner at Leverage Partners Inc. in Louisville, Ky., which helps CIOs manage their IT suppliers. Contact him at BartPerkins@LeveragePartners.com.

SPEED RACERS

FOR GENERAL MOTORS CORP., Ford Motor Co. and DaimlerChrysler AG, the bottom line is, and always will be, to sell more cars than the other guy.

To win that race, especially in the current economy, an automaker has to build cars better and faster than its competitors and sell them at a higher profit margin. To accomplish those goals, all three automakers are relying more than ever on IT to streamline operations, cut costs, improve quality and speed up production.

The biggest of the Big Three, GM, is pushing to become the world's first digital manufacturing company by embedding digital technology into virtually every one of its core business processes and linking them on common computing platforms. The idea is to shave time and costs off everyday operations by connecting people, processes and technology in real time.

CIO Ralph Szygenda says the ultimate goal is to revolutionize GM's culture and change the way consumers, suppliers and dealers do business with the company. The only way to do that, he says, is to marry the adroit application of IT with the opportunities provided by the Internet to change processes as well as culture. It's a transformation that's already well under way with several Internet applications.

GM's SupplyPower Internet application enables 12,000 suppliers to conduct various purchasing transactions online. Its DealerWorld Web application connects car dealers to GM so they can bid on leased vehicles that were returned to other dealers and are now owned by GM's financial services arm, General Motors Acceptance Corp. GM's BuyPower is a consumer Web site that provides data on all GM models.

For the past six years, Szygenda and his team have

IT fuels the Big Three's push to build and sell cars faster and cheaper. By Linda Rosencrance

been cleaning and rebuilding GM's worldwide IT house. When they first started, GM's business operations weren't very well integrated with IT. In fact, they were separate business units, Szygenda says.

"We had to change the speed of how we do things at GM," he says.

So he and his team of 1,700 Information Systems and Services (ISS) employees ripped out 3,500 of the company's 7,000 legacy systems and replaced them with \$1.7 billion worth of Internet applications. Today these are the foundation for GM's business web, which links the company with its suppliers, dealers, customers and employees. GM's ISS group develops applications, but Electronic Data Systems Corp. in

Plano, Texas, its primary outsourcer, builds and implements them.

The business web also incorporates innovations such as customer data warehouses, integrated service centers and customer relationship management applications. Those features are intended to create value by attracting and retaining customers through cross-selling and optimizing customer interactions with the company, Szygenda says. There's also a significant financial payoff: Since 1996, streamlining IT has shaved about \$800 million per year from GM's annual IT budget, which is \$3 billion for 2002, allowing the automaker to recoup its initial investment of more than \$1.7 billion twofold.

THE BIG THREE AT A GLANCE

General Motors Corp.

2001 REVENUE: \$177 billion

NET INCOME: \$601 million

VEHICLES SOLD: 8.5 million

MANUFACTURING PLANTS: 233 in more than 30 countries

ANNUAL IT BUDGET: \$3 billion

Ford Motor Co.

2001 REVENUE: \$162 billion

NET LOSS: \$5.5 billion

VEHICLES SOLD: 7 million

MANUFACTURING PLANTS: 180 in 26 countries

ANNUAL IT BUDGET: \$3 billion

DaimlerChrysler AG

2001 REVENUE: \$136 billion

NET LOSS: \$590 million

VEHICLES SOLD: 4.5 million

MANUFACTURING PLANTS: 180 in 37 countries

ANNUAL IT BUDGET: Company wouldn't disclose

What's more, product development time — from design to production — for all GM products has dropped from 45 months to between 18 and 24 months. Since GM has digitized the design and conceptualization of its vehicles, new cars are designed with a computer-aided design (CAD) program, and die construction and structural testing are done with computer modeling.

At Ford, where CIO Marv Adams has been hard at work consolidating the company's legacy platforms, the focus is on basics such as exhibiting quality in everything the company delivers to the marketplace.

Adams says Ford's IT strategy reflects the companywide back-to-basics philosophy. The automaker is standardizing and simplifying its core IT infrastructure and building out an enterprisewide Web services-like architecture that it believes is critical to delivering the kind of integrated, real-time systems the automaker needs in order to speed development and production and cut costs.

Like GM, Adams says, Ford has hundreds of disparate data and legacy communications systems. Ford's goal is to have a standard set of real-time systems that allow data to be transparent across all business units, he says. "In three to five years, we hope to have only five core platforms," he says.

DONNA TEREK



45 We [in IT] are right up front with our business partners to understand where they are going and what they want to accomplish.

SUE UNGER, CIO,
DAIMLERCHRYSLER AG

Sharing Their Way to Speed and Profits

COLLABORATION TECHNOLOGIES are playing an increasingly key role in automakers' efforts to cut costs and build vehicles faster and better.

The Big Three are tapping the Internet so workers, supply chain partners, dealers and even customers can share business processes, decision-making, workflow management and information.

Over the past four or five years, CIO Marv Adams says, Ford has become more electronically bonded to its customers, suppliers and dealers.

"We have engineers all over the globe who use collaboration technology as they interact with each other and suppliers to collaborate real time and realize the benefits of simultaneous engineering," Adams says.

One example is Ford's C3P system, which tears down the walls between business and manufacturing processes by linking the company's computer-aided design, management and engineering systems and product information management systems. Ford's C3P product development software manages engineering data and gives Ford's in-house users and its suppliers access to that information.

The system enables Ford and its suppliers to collaborate closely because they are working from a common set of parts and component specifications. This speeds product development because it eliminates the need for engineers to search through numerous databases looking for parts information.

Another key collaborative system is Ford's central database, known as its customer knowledge system, or CKS, which acts as the integration point for dealers and customers on the Internet and in the call centers. The CKS provides real-time information on all aspects of the customer experience, says Kristin Odeh, director of global consumer systems at Ford.

Odeh says the CKS currently houses some 60 million customer records that dealers can access to produce customized mailings

for consumers. She says there are also Web tools in place so dealers can build their own Web sites with the same look and feel as Ford.com, the corporate site. In addition, Ford dealers and customers can access a complete online inventory of vehicles and parts across all dealerships, she says.

GM has linked its business to its customers through GM BuyPower, a one-stop online shopping site that allows a consumer to build the exact vehicle he wants, find it at a nearby dealership, get incentive information, request the dealer's best price and even apply for financing, explains CIO Ralph Szygenda.

For GM BuyPower, the company worked side-by-side with its dealers to create a seamless online shopping and buying experience for consumers. On the technology side, GM incorporated Java 2 Enterprise Edition to build a single infrastructure for GM BuyPower that it says allowed scalability, flexibility and rapid deployment in multiple languages and currencies.

Another Internet application, GM SupplyPower, is a customizable, secure Web portal that allows suppliers to conduct real-time transactions with multiple GM organizations to complete a variety of business interactions, according to Szygenda.

GM's DealerWorld is an online portal that provides comprehen-

sive support for the day-to-day business activities of GM dealers. DealerWorld gives dealerships access to GM departments, including sales, finance, parts and service.

DaimlerChrysler kicked off its internal eCollaboration project in June. Expanding on its IBM Lotus Notes- and Domino-based IT infrastructure, DaimlerChrysler will implement Lotus Software Group's workgroup workflow applications, advanced mobile support and real-time collaboration offerings to its employees on a worldwide basis to optimize internal processes.

This project directly follows the completion of a five-year infrastructure project focused on implementing Lotus software in 80 locations around the globe.

Jim Hall, an analyst at New York-based Deloitte Consulting, says automakers are wise to invest in collaborative commerce processes and technologies because they have the potential to enhance the abilities of all participants in the automotive supply chain participants to collaboratively design, build, sell and service products faster, more efficiently and more cost-effectively.

And that goes straight to the bottom line of making and selling cars faster and more cheaply.

— Linda Rosencrance

PROJECT STRATEGIES OF THE BIG THREE

GM

- To enable consumers to build, buy and finance customized vehicles over the Internet.
- To give dealers electronic access to GM's sales, finance, parts and service departments.

Ford

- To electronically link design, management, engineering and product data management processes.
- To provide dealers and customers with a single access point for real-time customer information.

DaimlerChrysler

- To optimize internal processes with new, real-time workgroup/workflow applications and advanced mobile support.
- To link all aspects of vehicle design, production, finance, marketing, procurement and logistics operations via the Internet.



The outsourcing model let us change from a decentralized company to one of the most centralized IT organizations in the world, and the changes are showing up in the bottom line.

RALPH SZYGENDA, CIO, GENERAL MOTORS CORP.

Such standardization and simplification are already saving Ford \$150 million per year out of its \$3 billion IT budget — money the company uses to fund new IT initiatives, such as eSmart, a parts replenishment system developed by Santa Clara, Calif.-based WhereNet Corp. This real-time parts-locating system is based on a wireless tag and a network of readers that locate and track tags that have been attached to supplies. The system also provides a database of parts information, which in turn supports supply chain visibility applications.

The eSmart system speeds production by letting manufacturing line workers submit parts requests for delivery to their workstations by simply triggering a button on the WhereNet system. A timer enhancement invented by a Ford employee allows users to manage the call process more effectively by keeping track of exactly which part was called, when it was called and the duration of the delivery process.

"ESmart lets us have the right inventory at the line at the right time," says Kristin Odeh, director of

Ford's global consumer systems. "It also lets our suppliers know when parts are low so they can start shipping into our warehouse."

Adams says Ford is also in Phase 1 of a three-year initiative, started earlier this year, to build an enterprisewide Web services-like architecture that is designed to support the integrated real-time information-sharing that Ford needs in order to build cars cheaper and faster.

Over the three years of the project, Ford could save as much as \$300 million, Adams says. Consolidating its legacy systems has already helped Ford cut its vehicle development time from 37 months to 24 or less, he says.

At DaimlerChrysler, CIO Sue Unger says it's critical to integrate IT with the company's business strategy and to standardize its infrastructure to stay competitive in the race to sell more cars.

Two years ago, DaimlerChrysler unveiled a three-year Web-based initiative called FastCar, which includes the deployment of a Web infrastructure that links all aspects of vehicle design, production, financing and marketing, plus procurement and logistics operations.

FastCar provides real-time transparency to the product development process by linking the company's CAD software with the business infrastructure. Already, the vehicle production time has been cut from five years down to 12 to 18 months, Unger says.

"Going forward, we see a huge opportunity for us to streamline our infrastructure and look for ways to drive costs out and reinvest those savings back into upgrading the infrastructure," says Vince Morrotti, DaimlerChrysler's chief technology officer.

Morrotti says the company is also looking to drive



We have engineers all over the globe who use collaboration technology as they interact with each other and suppliers to realize the benefits of simultaneous engineering.

MARV ADAMS, CIO, FORD MOTOR CO.

costs out of its IT budget by consolidating its 76 global sales and marketing data centers into four regional, massively scaled data centers.

Unger declined to say how much DaimlerChrysler spends on IT annually, but she says the company is saving 15% to 25% every year because of its consolidation efforts and IT's tight alignment with the business overall.

"It's really important that IT is heavily aligned with our business strategy," Unger says. "We are right up front with our business partners to understand where they are going and what they want to accomplish. Our role is also to look at current or new technology to see how it might impact their business objectives." ▀

BEYOND THE BIG THREE

Read how Toyota is tapping collaboration technology to link more than 1,100 dealers with its customer information system.

QuickLink: 31376

Check out how Fiat saved \$2.5 million by automating its invoice processing procedures.

QuickLink: 31375
computerworld.com

Three Different Routes to IT Staffing

GENERAL MOTORS CIO RALPH SZYGENDA runs a 100% outsourced IT shop. And although GM is in the middle of a 10-year contract with EDS, every major vendor in the world works inside the giant company.

Outsourcing enhances GM's flexibility, plus it helps the company move fast and stay on the leading edge of new technologies, Szygenda says.

"The outsourcing model let us change from a decentralized company to one of the most centralized IT organizations in the world, and the changes are showing up in the bottom line," he says.

Although GM uses thousands of outsourcers to do the "arms and legs" programming work, GM IT executives are still responsible for setting IT strategy, defining specifications and overseeing operations and programs run by outside service providers, Szygenda says.

Ford is taking an entirely different route to IT staffing by minimizing outsourcing and converting many of its current contract positions to full-time jobs, according to CIO Marv Adams. Ford began its migration away from contract workers last fall under an initiative dubbed Project Renaissance. Adams says Ford has hired nearly 500 new employees in the past year, bringing the total number of people in the IT department to 6,400, including contractors.

Kevin Prouty, an analyst at AMR Research Inc. in Boston, praises GM's decision to outsource application development

while keeping the incubation of ideas in-house.

"While not perfect, GM has figured out what to outsource and what to keep in-house," he says.

Prouty says that Ford, on the other hand, has decided to bring its IT functions in-house to try to control as much of its infrastructure as possible.

Adams says Ford thinks it's critical to the operation of the company, as well as to the development of its vehicles, that it have a more significant role in the development of its IT strategy. The main reason Ford decided to bring its IT functions back in-house

was so it wouldn't be so dependent on service providers and partners, he says. It also wants to build out its IT capability while eliminating the margin it often pays to outside providers.

DaimlerChrysler CIO Sue Unger says the automaker has about 4,000 people in its IT department, including contractors and employees. But vendors also have a role to play.

"We do a lot of partnering. . . Sometimes it's a combination of our technology partners like IBM, i2, and hardware providers like Sun, and Microsoft," Unger says.

— Linda Rosencrance

STAFFING STRATEGIES OF THE BIG THREE

GM

- Has 1,700 IT employees, plus more than 20,000 IT contract workers.
- Has outsourced 100% of IT operations under a 10-year contract with EDS and other vendors.
- In-house IT and business executives set strategy, define specifications and oversee operations.
- IT organization is highly centralized.

Ford

- Has 6,400 IT workers, including contractors.
- Key labor strategy is to migrate away from contract workers.
- Has hired nearly 500 IT employees in the past year.

DaimlerChrysler

- Has approximately 4,000 IT workers, including contractors.
- Partners extensively with IT vendors on key IT projects.
- Key IT strategy involves consolidating 76 global data centers into four massively scaled data centers.

IT'S 3 P.M. ON JULY 3, a few hours before the long Fourth of July weekend, and Jill Fosmire is fully engaged in her most serious crisis since taking her job nine months ago.

FMC Corp., a \$2 billion Philadelphia-based chemical company, outsources its global wide-area network and telecommunications to Plano, Texas-based Electronic Data Systems Corp., and EDS relies on the communications networks of now-bankrupt WorldCom Inc. Her biggest question is, Will WorldCom's communications systems fail? If so, what then?

"We're having daily, sometimes hourly conversations with EDS on this. We can't afford to have our network down," Fosmire explains. She asks EDS for a contingency plan, and her own team sketches out alternatives.

In this newly created position of "manager, IT outsourcing and contracts," Fosmire's job is to handle outsourcing crises such as these, as well as daily communication with service providers. A 20-year IT and business veteran, she's part marriage counselor, part quality-control maven, part saleswoman and exactly what FMC needed to keep its four IT outsourcing relationships focused on business results.

"We realized we spent a lot of time managing our internal resources through development discussions and performance feedback, but we were

missing that same type of relationship from our outsourcing partners," says Dave Kotch, director of enterprise systems and programming, who was part of the team that hired Fosmire from her previous job as manager of business information systems at FMC.

Outsourcing relationship manager positions are on the rise as outsourcing agreements become more complex and business environments more unpredictable. "The average outsourcing deal is seven years," says Dennis McGuire, CEO of TPI Inc., an outsourcing consultancy in The Woodlands, Texas. With the current pace of organizational change, most deals need to be renegotiated within three years, he adds.

This has created a serious need for seasoned negotiators on the enterprise side who have a combination of IT experience, business savvy, salesmanship, problem-solving skills and a tight relationship with executives.

The Right Stuff

Industry watchers say that CIOs are looking for relationship managers with 15 to 20 years of senior-level technical and business experience plus a host of problem-solving techniques. "The best relationship managers understand how problems get created and how likely

deficiencies have multiple causes. They can set up joint problem-solving sessions and mediate disputes with multiple parties," says Stuart Kliman, a founding partner at Vantage Partners LLC, a consultancy in Boston.

For example, if a service provider isn't meeting a service level in one area but is delivering more value in another, the relationship manager might negotiate to redistribute services, notes Lorie Scardino, an analyst at Gartner Inc. And while these managers need to have solid IT backgrounds, they must also understand the business value of the outsourcing relationship, she says. So it's important to have contract knowledge and close ties to the business side of the enterprise.

At Fireman's Fund Insurance Co. in Novato, Calif., CIO Billy McCarter was assembling a 12-person relationship management team of seasoned IT and financial professionals before the ink had dried on a \$380 million IT outsourcing deal with Montreal-based CGI Group Inc. last August. More than half the team has more than 15 years' experience. Eight people came from management or senior leadership positions outside the company, including the Big Five consultancies. The group's leader, however, was appointed internally.

"I was involved in large outsourcing deals in other companies," McCarter explains. "They tried to outsource the management of an outsourcing relationship, but that didn't work."

Michael Stevenson, senior director of IT infrastructure services, has 17 years of IT experience, including 10 at IBM Canada, four as a business systems development manager at Fireman's Fund and three years as an infrastructure manager in IT. "Having been in different parts of IT has given me the breadth of experience I need," he says.

Stevenson remembers the second day of the outsourcing agreement, when CGI had failed to complete some small task and Fireman's Fund's attorneys immediately wanted to jump in.

"Early on, there are a lot of parties that feel they have to help with this process. You have to keep all those groups on an even keel," Stevenson says. He quickly resolved the conflict without the attorneys' help.

Fosmire was also hired internally because of her broad experience in sales, IT, contract administration and purchasing, and the internal relation-

ROOM TO GROW

IT outsourcing
will increase from
\$100B
in 2001 to
\$141B
by 2005

SOURCE: GARTNER INC.

WHAT IT TAKES

Job title: Relationship manager

Job description: Maximizes outsourcing business value through daily contact with service providers, monitoring service and performance and managing conflicts.

Salary: \$90,000 to \$150,000

Ideal background: 15 to 20 years of experience in a wide range of IT and business roles.

Skills required: Solid IT background; business, problem-solving and negotiation skills; contract management. Knowledge in pricing.

Reports to: CIO for full-service or complex outsourcing deals; business unit executives for smaller deals and contracts.

Career path: Higher-level IT position, such as director, vice president or CIO; director or vice president of procurement; partnership manager for other joint ventures.

ships she had forged along the way.

But Gartner's Scardino says she has observed that external hires, such as former employees of IT consulting firms and systems integrators, also have the right stuff for effective relationship management.

"They are the people who have just got burnt out living on the road — 45- to 50-year-old IT professionals," Scardino explains. The most likely candidates are those with experience in sourcing infrastructure, software seat-license management and service-level pricing, she adds.

For many companies, the relationship manager position is new and executives haven't mapped out career paths for them. But industry observers say there's room for upward mobility.

"If an enterprise thinks of the relationship manager as a partnership manager, I can see them moving . . . into line responsibilities for various other kinds of joint ventures and alliances," Kliman says.

Stacy Collett is a freelance writer in Sterling, Va.

HOW MATURE ARE YOUR RELATIONSHIPS?

Read how Meta Group assesses outsourcing relationships.

QuickLink: 31800
www.computerworld.com

Wanted: OUTSOURCING RELATIONSHIP MANAGERS

Their prime role is driving business results from outside IT service providers. By Stacy Collett

Choosing The Best Security Guards

IT tackles management issues via service providers.

By Deborah Radcliff

AFTER THE NIMDA VIRUS crippled his network for nearly three days in October, Richard Diamond figured there had to be a better way to protect his system. "I wanted to put in a reasonable intrusion-detection system, but I didn't have the resources in-house to integrate our security components and monitor them," says Diamond, CIO at Doctor's Co., a physician-owned medical malpractice insurer in Napa, Calif.

Diamond outsourced his security management to Symantec Corp. in Cupertino, Calif., a vendor of antivirus products that has joined dozens of other product vendors that are expanding their offerings to include managed security services. These vendors review and correlate audit information from different sources, weed out false positives and alert customers to security events and how to respond.

Managed security services providers (MSSP) are addressing a very real need as IT departments are drowning in reams of alerts and false alarms coming from virtual private networks (VPN) and firewall, intrusion-detection, antivirus and other security monitoring systems and logs, says John Pescatore, an analyst at Gartner Inc. in Stamford, Conn. At the same time, it's

impossible for most companies to hire and keep an expert staff to sort through all of those reports on a daily basis, says Pamela O'Leary, senior vice president of information services at Rockland Trust Co., a banking service in Rockland, Mass.

There's no denying the value of these services, says O'Leary, who figures she's saving 35% annually by outsourcing security event monitoring to Riptech Inc. in Alexandria, Va. And The Regence Group, an insurance administration company in Portland, Ore., reports saving 80% per year by

hiring Counterpane Internet Security Inc., also in Cupertino, to manage its security event monitoring.

But analysts warn that relying on an MMSP is something of a double-edged sword. There's always the chance that the provider doing business today may not be around next year. This is especially true now with managed security services because providers are struggling with the traditional fallout, fragmentation and consolidation that accompanies most new technology or technology services markets. Service providers also differ widely in terms of the devices

they monitor and how they correlate and analyze the information they collect. And vendors' profitability boils down to how well they automate event correlation and analysis, which can be very time-consuming and expensive if done manually, says Peter Stapleton, director of product management at Ubizen NV, a monitoring services provider in Reston, Va.

"Trust in vendors is a pretty big issue in this market, given the fact that last April we saw Pilot Network Services and the Salinas Group go out of business rather abruptly," says Allan Carey, an analyst at Framingham, Mass.-based IDC.

Not all providers offer equal monitoring coverage (see chart). While many customers may opt for just Web filtering, only a few providers offer the service. Other companies might want their providers to analyze audit data from nonsecurity devices. For example, the company that powered the Winter Olympics tapped Counterpane to monitor all systems and networks for security events, including its Digital Equipment Corp. machines.

Gartner classifies Counterpane, Guardent Inc. in Waltham, Mass., Riptech and Ubizen as leading moni-

toring service provider "pure plays," meaning providers that offer vendor-agnostic coverage.

A second emerging category of providers comprises vendors such as Symantec and Atlanta-based Internet Security Systems Inc., which offer security products but are expanding to offer add-on security monitoring services. But these companies, which logically have their own competitive agen-

das, will service only their own antivirus and intrusion-detection products. And they monitor only third-party firewalls and VPN devices from vendors with

which they have strategic partnerships. That may require some users to reinstall only supported products, which O'Leary says she was unwilling to do.

But Doctor's Co., which has little security to begin with, didn't mind installing intrusion-detection and anti-virus software to conform to Symantec's monitoring capabilities, Diamond says.

It seems like everyone wants a piece of what Gartner predicts will be nearly a \$6 billion MSSP market by 2005. Telecommunications and Web hosting companies, large systems integrators and the Big Five all offer some managed security services. But none are as robust as the pure plays, according to Gartner.

"The bottom line is that MSSPs are still getting funded, and they're proving value," says Carey. "But it's tough to point anyone in the right direction, because the market is truly evolving." ▀

Radcliff is a freelance writer in Northern California. Contact her at drad@aol.com.

PICKING A WINNER

Choosing the right MSSP
QuickLink: 31794

Symantec and NAI outline their strategies:

QuickLink: 31937
www.computerworld.com

What They Offer

COMPANY NAME	MANAGED SECURITY SERVICES						MONITORING SERVICES				Incident response (IR) and forensics capabilities	Cyber insurance
	Antivirus	Firewalls	Intrusion-detection system	Virtual private networks	Vulnerability scanning	Web blocking/filtering	Antivirus service available	Only security devices	Portions of the network	Entire network		
Counterpane	•	•	•	•	•		•			•	IR	Yes
Internet Security Services	•	•	•	•	•	•	•			•	Yes	Yes
Riptech		•	•	•	•		•	•	•	•	Yes	Yes
Symantec	•	•	•	•	•	•	•	•		•	Yes	Yes
Ubizen		•	•	•	•		•	•			Yes	No
Vigilix Inc.	•	•	•	•	•	•	•			•	Yes	No

WebSphere. software

INTEGRATION PLAY

- 1] WIN WITH INTEGRATION: Nothing fishy about it. For an e-business to thrive, all your business processes, from supplier to customer, must work together seamlessly. It's the key to a profitable infrastructure.
- 2] WIN WITH WEBSphere: As the world's #1 integration software, WebSphere connects more applications, platforms, processes and people than any other software. WebSphere. Part of our software portfolio including DB2®, Lotus® and Tivoli®.
- 3] MAKE THE PLAY: Visit **ibm.com/websphere/integrate** and see a Webcast on how WebSphere can help cut integration costs.

@business is the game. Play to win.™

NEEDS TON
OF TUNA

LANDS TON
OF TUNA

HAS HANKERING
FOR SUSHI

IBM®

Results from the IDC Worldwide Integration Server Software Applications and Services Market Analysis, 2002-2006. © 2002 IDC. IBM, DB2, Lotus, Tivoli, and WebSphere are trademarks of International Business Machines Corporation in the United States and/or other countries.

Dear Career Adviser:

I've been working with Informix 4GL on application development at a company that will soon merge with another. The new IT environment involves Web-enabled applications. Any suggestions to help me keep my job?

— MERGER MIKE

Dear Mike:

Managers need to understand the complexity of merging applications when they're merging their businesses, says Federico Zoufaly, executive vice president of Bellevue, Wash.-based ArtinSoft, a company that specializes in software migrations and upgrades. Right now, your value lies in being a bridge to the new entity, helping in the task of merging applications and migrating

the data from one entity to another.

Your knowledge of legacy code, plus your understanding of the business logic and business processes of your current company, are the skills that will probably help you stay with the merged company and give you some breathing room to learn new technologies. Once you understand how the older technologies map to the new ones, you could be quite helpful, not just to your com-

pany but to other companies and government entities involved in similar projects.

Dear Career Adviser:

I'm a Web programmer who has been working with Active Server Pages and Crystal Reports. I also have a year of mainframe experience and two years of Java. I want to select a focus for the future — perhaps ERP or Oracle Financials, or even move into database work

— so I can become certified. What can you recommend?

— SEEKING ADVICE

Dear Seeking:

Databases and enterprise resource planning (ERP) are two key areas of strength for IT professionals. Oracle Financials "is a mature part of the Oracle business suite, while Oracle9i is a certification program that is actually growing like crazy," according to Chris Pirie, vice president of Oracle University, which has trained 670,000 students worldwide, both online and in person.

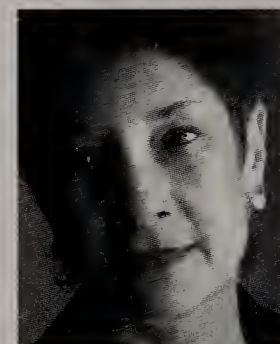
Your first task is to identify an area that interests you and then evaluate whether a certification will be the

calling card that will help you differentiate yourself. An Oracle database administrator might earn \$60,000 to \$120,000, but having the certification will give a candidate a 21% salary advantage on average, Pirie says.

No matter which certification you select, be sure to take full advantage of the professional community that opens up to you once the credential is yours. For example, the Ora-

cle Technology Network (www.oracle.com/otn) has 2.4 million registered members.

Remember that in this economy, you, rather than your company, might have to foot the bill for a certification, so make sure to compare costs and results for online vs. classroom training. ▀



FRAN QUITTEL is an expert in high-tech careers and recruitment. Send questions to her at www.computerworld.com/career_adviser.

WORKSTYLES

Flexibility, Security Mark IT at FDA

Connie Guerra, IT specialist and systems administrator for the Food and Drug Administration's Enterprise Administrative Support Environment (EASE), discusses how flexibility and responsiveness to change shape her IT shop, which tracks the constantly changing staff of the FDA.

What are the most critical systems supported or developed by your department on a daily basis? "EASE is the FDA's corporate repository of personnel-related data. It provides personnel, organization and locator information; automates time and attendance; and provides ad hoc reporting through its associated data warehouse.

"Within the rest of the IT

program areas, we have systems that support the effort of protecting the public health — databases that help collect information and monitor food safety and regulated products such as medical device information. Those systems interface with our system to manage their human resources and to verify their personnel information."

Have there been any recent changes to your department's charter or culture? "The events of 9/11 brought about a re-evaluation of security initiatives. There's been an increased focus on getting security clearances for people and keeping our network resources and applications secure. We've also gotten

some extra funding for our security initiatives, such as acquiring people with special skills for security and bioterrorism. That directly affects my work because of the need to further track employees and make sure everyone has the right level of security and has been trained in computer awareness so they're not sharing passwords and are generally aware of security implications."

How would you describe the

pace of work? "We have business as usual, but there's also a lot of change. We have a lot of people coming on board, and we're getting them integrated into the system, and there's a whole avenue of orientation that has to be done"

How would you describe the overall culture of IT? "We're relatively family-oriented, because we allow for flexible work schedules. Our 'maxi-flex' schedule allows you to

earn credit hours for working extra hours in a day. With the 'any-80' system, you can work any 80 hours in your two-week pay period."

How much interaction does your department have with end users or other departments?

"That's one of the things we're really starting to work toward — trying to stay very customer-oriented. Every two weeks we have a meeting with representatives from each of our eight centers to talk about issues, enhancements, feedback, requirements-gathering and other types of information."

What aspect of work do you look forward to each day? "Creating something new, dealing with people and the fact that there's always a process to automate or something that can be enhanced, changed or modified."

— Mary Brandel
brandels@attbi.com



Food and Drug Administration

Interviewee: Connie Guerra, IT specialist and systems administrator, Enterprise Administrative Support Environment (EASE)

Type of business: EASE handles the FDA's personnel data.

Main location: Washington

Number of IT employees: Six in EASE; 447 in the eight centers of the FDA

100% Dell performance and reliability. Up to 50% less than the competition.

PowerConnect Switches...100% no-brainer.



Right now, get \$100 off Dell's
NEW 48 Port PowerConnect Switches.

Dell | Managed Switches

PowerConnect™ 3024* Switch

Scalable, High-Performance Managed Switches

- 24 Fast Ethernet Ports Plus 2 Built-In Gigabit⁵⁰ Uplinks
- Up to 12.8 Gbps of Wire-Speed Switching Capacity
- Stackable (Supports up to 144 FE Ports in a Stack)
- 3-Yr Next Business Day Parts Replacement⁵²

\$699 as low as **\$20/mo.**, (46 pmts⁵³) 60 Days
Same-As-Cash for qualified customers
E-VALUE Code: 12878-S10806

PowerConnect™ 3048* Switch

Rack-Dense, High-Performance Managed Switches

- 48 Fast Ethernet Ports Plus 4 Built-In Gigabit⁵⁰ Uplinks
- Up to 21.6 Gbps of Wire-Speed Switching Capacity
- Stackable (Supports up to 144 FE Ports in a Stack)
- 3-Yr Next Business Day Parts Replacement⁵²
- Sale Price Includes \$100 Discount

\$1199 as low as **\$34/mo.**, (46 pmts⁵³) 60 Days
Same-As-Cash for qualified customers
E-VALUE Code: 12878-S10811b

PowerConnect™ 5012* Switch

High-Performance All-Gigabit Managed Switches

- 10 Built-In Copper Gigabit⁵⁰ Ports Plus 2 GBIC Slots
- Up to 24 Gbps of Wire-Speed Switching Capacity
- Remote Access and Management Capabilities
- 3-Yr Next Business Day Parts Replacement⁵²

\$1299 as low as **\$37/mo.**, (46 pmts⁵³) 60 Days
Same-As-Cash for qualified customers
E-VALUE Code: 12878-S10812a

PowerConnect™ 3248* Switch

High-Performance Enterprise Class Managed Switches

- 48 Fast Ethernet Ports Plus 2 Built-In Gigabit⁵⁰ Uplinks
- Multi-Layer Traffic Classification at Layers 2, 3, and 4
- Advanced Management via Browser or Industry-Standard CLI
- 3-Yr Next Business Day Parts Replacement⁵²
- Sale Price Includes \$100 Discount

\$1399 as low as **\$40/mo.**, (46 pmts⁵³) 60 Days
Same-As-Cash for qualified customers
E-VALUE Code: 12878-S10813



Managed switches you can count

on to do more than just save money. Just what you'd expect from Dell, proven technology that cuts costs. So whether you're building your first network or expanding your existing one, Dell PowerConnect managed switches can handle your busy organization and help you save money. Equipped with the latest industry-standard technology, PowerConnect switches are highly interoperable and easily integrate into an existing network. They're scalable for future growth and have easy-to-use management features to help you improve network up-time and security. PowerConnect switches include Next Business Day⁵² Parts Replacement and, of course, they're all backed with Dell's service and support. Choosing Dell PowerConnect switches means you won't have to sacrifice performance for price. And that's a concept you'll definitely want to plug into.



VALUE

USE THE POWER OF THE E-VALUE CODE.

Match our latest technology
with our latest prices. Enter the
E-VALUE code online or give it
to your sales rep over the
phone. www.dell.com/evalue

Growing your network. Easy as **DELL**

Visit www.dell.com/switch or call toll free 1-866-218-3355.

Call: M-F 7a-9p/ Sat 8a-5p CT.

Pricing, specifications, availability, and terms of offer may change without notice. Taxes and shipping charges extra, and vary. U.S. new purchases only. **LIMIT 5 DISCOUNTED OR PROMOTIONAL ITEMS PER CUSTOMER.** In case of customers leasing under these promotional, please note that item is not for sale.

*This device has not been approved by the Federal Communications Commission for use in a residential environment. This device is not, and may not be, offered for sale or lease, or sold or leased for use in a residential environment until the approval of the FCC has been obtained.

Monthly payment based on 48-month QuickLoan at 12.99% interest rate for qualified Small Business customers. Your interest rate and monthly payment may be same or higher, depending on your creditworthiness. Minimum transaction size of \$500 required. Maximum aggregate amount of \$25,000. Under 60 Days Same-As-Cash QuickLoan, interest accrues during first 60 days after QuickLoan Commencement Date (which is five days after product ships) if balance not paid within these 60 days. OFFER VARIES BY CREDITWORTHINESS OF CUSTOMER AND CREDIT REVIEW. Shipping charges are extra and may vary. Not valid on past orders or financing. QuickLoan arranged by CIT Online Bank to Small Business customers with approved credit. *This term indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not constitute an actual optical high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required. Service or replacement unit (depending on service contract) may be provided by third-party provider. Technician or replacement unit will be dispatched if necessary within 24 hours of receipt of service request. Dell must notify the service provider before 5pm (depending on service contract) customer time. Availability varies. Dell, the stylized E logo, E-VALUE, and PowerConnect are trademarks of Dell Computer Corporation. ©2002 Dell Computer Corporation. All rights reserved.

In a volatile market
Your best investment
is your
professional network.

Get connected...

Join Now!
witi.com



Every professional woman uses technology in order to succeed in business today. WITI is the place where these successful women come to meet.

EXPAND YOUR PROFESSIONAL NETWORK

Over 30 chapters in most major cities provide you personal networking opportunities on an ongoing basis. To find a chapter near you visit us at www.witi.org. *Now available to members only* – WITI MEMBERSHIP DIRECTORY.

ACCELERATE YOUR CAREER WITH WITI PROGRAMS

As a WITI member, you receive valuable members-only discounts on professional development, leadership and community outreach programs.

GET EXPERT ADVICE

Receive confidential advice and immediate answers from respected professionals on WITI's Listserv – a members-only benefit.

Feel the support of your professional peers & talk to women that are facing similar business challenges!

WITI is introducing:

THE WITI SMALL BUSINESS MEMBERSHIP –

First-Class, Business-Class and Coach for Start-Ups

A growing number of women who run small businesses want the opportunity to showcase their products and services to WITI Women and WITI Associates. For more information on **WITI SMALL BUSINESS MEMBERSHIP** visit witi.com or call us at 800.334.9484

WITI
**PROFESSIONAL
ASSOCIATION**

Advancing Women Through Technology

System Analyst/developer to design & code software components, units, modules & tools for client/server applications using Korn, awk, perl, C++, & AutoSys. Work w/Oracle 7.3, Unix queues & semaphores, object modeling techniques, SOR & Rogue Wave Libraries. Develop & implement algorithms in C & ksh. Test & debug assigned components & units. Participate in large system and subsystem planning & implementation. Required M.S.C.E & 2 yrs. exp. M-F, 40 hrs/wk + o/t. Freq. reloc. within U.S. may be necessary. Send resume to J. Brigham, HR Ref. A16, TEK Systems, Inc., 7301 Parkway Drive, Hanover, MD 21076.

Lead Programmer/Technical Architect wanted for position in Manchester, NH. Resp. for design and development of changes/enhancements to Siebel call center application and its integration with external Web and other applications. Duties include hands-on programming and providing technical direction to programmers and external consultants; acts as technical "go-to" person for applications development; helps guide selection and use of technology to solve complex business problems. Send resumes to Health Dialog, Inc., 60 State Street, Suite 700, Boston, MA 02109

Kama Consulting Inc.
TOP \$\$'s, W2 or 1099
We are a fast growing Consulting company based in North Carolina. Excellent opportunities for Programmers, Systems Analysts, DBAs.
Sun Solaris System Admins, Natural, Powerbuilder, ADABAS, ORACLE, SYBASE, PROGRESS, COBOL TCP/IP, Delphi/VB, Windows NT
Send your resume to Rod McFadden
Kama Consulting
Fax: 704-896-9660
Email: Kamaco@aol.com

SQL Server DB Admin. Hoffman Estates, IL DB admin, incl. supp./maint. for Microsoft SQL Server 6.5/7.0. Assist SQL Prog. & Bus. Analysts with adv. tech. needs for DB/servers. Install/config./supp./maint. client DB/DB servers. Disaster recov./ensure quality backups/perf.-tuning meas. for fast data response. Analyze client DB needs & plan for future capacity. Req.: B.S. in Bus. or computer-related field, 2 yrs. exp. DB admin.; incl. (may be concurrent) 2 yrs. exp. admin. SQL Server DB and 2 yrs. exp. using Microsoft Access. Resume: Mr. K. Hogue, HR Dir., Career Education Corp., 2895 Greenspoint Pkwy., Ste. 600, Hoffman Estates, IL 60195.

System Analysts/Software Engineers needed. Senior level positions available for candidates possessing MS/BS degree or equivalent and/or relevant work experience. Duties include: Analyzing processes; designing; developing, installing, implementing, customizing and maintaining software applications; Work with following: SAP, ABAP/4, Java, Oracle. Mail resume, references and salary requirements to: Eusophix International Corporation, 9951 Atlantic Blvd., #310, Jacksonville, FL 32225.

Analyst (network systems & data communications) - perform analysis, design, testing, evaluation etc. of LAN/WAN & other systems. Research & recommend proper hard/software to users. Maintain, troubleshoot & assist users w/ programs & implementations. Resolve technical issues. Coordinate overseas offices w/ user requirements, design, develop & solutions. Requires: BS-Computer Science (or equivalent); Microsoft Technologies Certification; 2yrs exp in computer software solution development. \$36K/yr (40hrs/wk). Apply with CV to: Sri Vepa, Systems Hardware Inc. 661 Brea Canyon Road, Suite 5 Walnut, CA 91789

Telecomm co seeks Network Design Engineer for Des Plaines, IL location. Must possess Associate's degree in Comp Sci/Comp Eng/Math/Physics & 1 yr in network eng position. Send resume to: resume@wfinet.com Attn: JNET.

Programmer Analyst needed. Provide analysis, design and modification of management, manufacturing, and database systems; develop and implement code in SQL, JAVA, HTML, CGI, Object Oriented Methodologies, and Visual Tools in a HVAC manufacturing facility. Min. req. B.S. in Comp. Engg. or Science, and 3 years experience as PA or programming in SQL and Visual Tools. B. Schuldt, Vision2Reality LLC, A Revcor Co., HR, 251 Edwards, Carpentersville IL 60110.

Programmer Analyst, TX: Use VB, SQL, C++, Active X, MS Access to analyze, design, develop & document Research Mngmnt Syst. Provide tech. support for development, implementation & maintenance of systs. Train end-users. Write tech. reports. Req: Bachelors (or foreign equiv or equiv in education and/or experience) in Mngmnt Info. Systems/related field & 2 yrs exp. in job offered or as IT Support Mngr. Mail resume to HR, Eurosoft Inc, 1705 S. Capital of Texas Hwy, Ste 202, Austin, TX 78746.

Multiple IT professional position openings by DataSoft. Minimum requirement is BS with at least 6-month exp as programmer/analyst or software engineer. Exp. in developing propriety software is a plus. Contact info@datasoft-consulting.com. EOE.

Infomercia is looking for system-programmer analysts, software/project engineers & computer consultants working at different sites (travel required). Candidates must have BS with 1-year exp. in IT fields. Skills of Oracle, Informix, Java preferred. Send resumes to info@infomerciainc.com

SOFTWARE CONSULTANT

Analyze & evaluate existing or proposed software systems. Dsgns, dvlpms, implmnts & improves programs, systems and related procedures to process data using in-depth knowledge of the systems dvlpmt life cycle. Encodes, tests, debugs and installs operating programs and other system software utilizing knowledge of RDBMS environments and programming languages. Bach. degree or equivalent in Comp. Sci., Math, Engrng, Bus., Commerce or Comp. Info. Sys. + 2 yrs of exp. in position offered or as a Prog. Analyst, Software Engrnr or Sys. Analyst/Mgr/Admin. reqd. Exp. must include: a) RDBMS Environments: Oracle or Sybase; and b) Programming Languages: Java or COBOL or PL/SQL. High mobility preferred. 40 hrs/wk, 8 am - 5 pm, OT as reqd, \$61,000/yr. Qualified applicants please submit resume to Manager, Westmoreland County CareerLink, 300 East Hillis Street, Youngwood, PA 15697-1808. Please refer to Job Order No. 263828.

Devel. Comp. req. Software Engg. w/Masters Deg. & 1 yr. exp. or Equivl. & Progg. Analyst w/BS deg. or its equivl. & 18 mos. exp. Write workflow using VC++, MFC, Active X, Com, STL, Multi threading. Des. data access module, w/FDR, FILENET, Dev, high+low level des, docs. Equivl. can be based on educ. & exp. Travel to client sites anywhere in US is required. Send res. to Top Source Intl, Inc. 2101-A Tatnall St. Wilmington, DE 19802.

Sr. Software Engineer, Atlanta: Design & develop horizontal & vertical B2B exchange platforms for customized real time info exchange using Java Server-side on Unix/Linux platform; use COM/DCOM, GUI, Security infrastructure tools, Component based architecture, AWT/Swing & SOAP/XML/XSLT/WSO/UDDI. Req: BS in comp. sci. & 3 yr. as engineer, programmer or developer including Visual C++, COM/DCOM, Javascript. Fax resume to: A. Sago, 770-730-3784.

Project Manager: Tampa, FL. Full Time. To provide project leadership and management for systems development and deployment related projects. Mentoring to other project driven areas of the corporation including Sales, Deployment and Management. Five years in job offered or 5 years experience in software systems analysis required. Fax resumes to L. Taylor @ (813) 262-2557.

SALES MANAGER
Pelco, Closed-circuit TV Manufacturer, located in Clovis, CA is hiring: Strategic Accounts Manager (Sales Manager) Job requires travel throughout the U.S. REQ: Bachelor's degree or equiv. in Bus. Admin., Marketing or related field (in lieu of Bachelor's, will accept 3 yrs exper in job, mktg, or rel.) +5 yrs exper in CCTV & video equip industry, incl. 3 yrs marketing exper w/ customer strategies. Resumes to: Pelco, HR, Attn: Kathy Tucker, 3500 Pelco Way, Clovis, CA 93612 or email to HR@pelco.com Affirmative Action/EOE.

Systems Analyst responsible for design and development of software applications for the company and its clients. Help clients in state-of-art internet and client server technologies under Windows NT using VB Script, COM, ActiveX and Java Script. Responsible for writing code in Visual Basic and Java using Object Oriented Programming Techniques. Use Object linking and embedding technologies and ActiveX to make the applications reusable. On-line analytical processing using Business Objects. Responsible for documenting the application and implementing business logic. Must have a Bachelor's degree in CS or foreign degree equivalent. Must have 2yrs of exp. in job offered. Salary: Competitive. Send resume to: Raj Shekaran Software Research Assoc 70 Mansell Ct. Ste. 100, Roswell, GA 30076

Corbis Corp. seeks Data/Info Sys's Analyst for Seattle Office. DESC: Monitor, maintain, & upgrade corp info sys's & DB's. Test, evaluate, & update h/w & s/w to determine efficiency, reliability, & compatibility w/ existing sys. Dev & impl stored procedures & file triggers to mod & cust info sys to meet evolving bus req's. Monitor DB & sys usage & perf. Maintain & admin data replication. Plan & execute DB backups, sys recov, & data, schema & config changes. REQ: 3 yrs of exp in skills & tech's listed above. Exp may be gained concurrently. Pls send resume to K. Avaiusini, CB-101, 15395 SE 30th Pl, # 300, Bellevue, WA, 98007. Job# required.

Financial Systems Software Developer: research, design and develop computer software systems for on-line banking and internet financial services on multi-threaded transactional servers. Bach & exper. required. Competitive salary. Send resumes to Juan Carlos Vizcaino. Todo 1 Services, Inc., 7600 N.W. 19th St. #600, Miami, FL 33126.

Lead Web Developer to design & develop complex interactive & transactional websites. Develop & tune interfaces between the internet & other database, marketing & customer relationship management systems. Program & develop using several languages & tools such as ASP, Visual basic 6.0, MTS, ActiveX, ADO, HTML, JavaScript, MS Visual Interdev 6.0, Visual Source Safe, MS IIS, etc. and SQL Server 2000 database. Write technical documentation. Required B.S.C.S or rel. field & 2 yrs exp. M-F, 40 hrs/wk + o/t. Freq. reloc. within U.S. may be necessary. Send resume to J. Brigham, HR Ref. A15, TEK Systems, Inc., 7301 Parkway Drive, Hanover, MD 21076.

Siebel Programmer wanted for position in Manchester, NH: Resp. for using Siebel tools to configure and customize applications. Duties include resolving day-to-day production issues; creating, modifying, and testing Siebel out-of-box functionality using Siebel VB; developing Smart scripts and upgrading applications; developing Siebel reports; export/import of applications in test environments; import/export validation; testing and analyzing configurations and recommending and implementing solutions. Send resumes to Health Dialog, Inc., 60 State Street, Suite 700, Boston, MA 02109

T-Mobile, USA, Inc., D/B/A VoiceStream Wireless is a leading provider of digital wireless communications. We are currently seeking professionals at our facilities in Florida in the software engineering area including the following position:

Applications Administrator II

The successful candidate will hold at least a Bachelor's or Master's degree in Computer Science/Engineering/Math/Physics or the equivalent with professional experience, where appropriate, depending on the grade level of the position.

T-Mobile offers an excellent compensation and benefits program including an exceptional 401(k) plan. For more detailed information on these positions and to submit your resume, please log on to www.t-mobile.com/jobs/ or send resume to 3111 W MLK Jr. Blvd, Ste 400, Tampa, FL 33607. We are an equal opportunity employer.

Computer Security Administrator to plan, coordinate and implement security measures to safeguard information in computer files against accidental and unauthorized modification, destruction or disclosure. Degree plus exp. required. Competitive salary. Send resumes to Juan Carlos Vizcaino, Todo 1 Services, Inc., 7600 NW 19th St., #600, Miami, FL 33126.

Systems Programmers. Multiple openings. Must have Bachelor's in Computer Science/related field, and min. 2 yrs IT exp. Coordinate, supervise installation of computer operating system software. Test, maintain, modify software. Coordinate installation of new computer hardware. Websphere and BMC Patrol Administration. Train other IT professionals. 40 hrs/wk, 9AM-6PM. Competitive Salary. Send resume to: Webmaxima, Inc., 826 Ward St., #9, Allentown, PA 18103.

Full time Systems Analyst & Systems Designer Architect positions available. Requirements and salary vary per position. Send resumes to: Athens Heart Center, 2005 Prince Ave. Athens, GA 30606. Attn: Sharon Eades.

Software Engineer. Design web based computer technology and software with the use of JAVA, ORACLE and MS SQL server on Windows and SUN Solaris. Req: Bachelors in Computer Science or Computer Engineering. 40 hr/wk. Job/Interview Site: Santa Monica, CA. Send resume to Reunion.com, P.O. Box 219, Santa Monica, CA 90401

Chicago, Illinois: Software Engineer, 40 hours per week 9:00am to 5:30pm; \$82,950 per year. Duties include: designs, analyzes, programs, debugs and tests C, C/C++, SQA and Unix Shell application to support data manipulation of Oracle 7.3, tape processing, report generating and network communication; develops customer-server application in GUPTA SQL, Windows, Tuxedo server, Database server and Unix server to access Oracle database from front-end interface; evaluates user requests for new or modified programs; programs and enhances Unix Shell scripts in Korn Shell, Perl and appropriate Unix system tools to set up Unix environments and make statistics for daily transactions; works with GUPTA support, Tuxedo, SCO and Sequent Unix. Require Bachelor's degree in Computer Science, plus 3 years experience in the job offered or as a programmer/analyst or system analyst in using tools including SQA, programming in C/C++ for communications and image processing, and using Database Server and Unix Server and communication protocols, Windows NT, DOS operation platforms, C/C++, Visual C++, Assembler languages. Applicants must show proof of legal authority to work in the U.S. Send resume to Illinois Department of Employment Security, 401 South State Street-7 North, Chicago, Illinois 60605. Attention: Leila Jackson. Reference # V-IL 27498-J AN EMPLOYMENT PAID AD, NO CALLS - SEND 2 COPIES OF BOTH RESUME & COVER LETTER.

Codesic seeks Dir. of Info. Bus. Sys. for Kirkland, WA HO office. DESC: Meet w/ bus. & IT mgrs. to id user reqs. Anlyz. bus. info. sys. & make recs. on tech. solns. & enhancements. Prep proposals & outline proj. specs. Mng. proj. teams thru full life cycle arch, dsgn, dev, & impl. of enterprise info. sys. & e-com & e-bus. apps. Recruit & mng. sys. dev. team members. Prov. perf. & career planning, training, & mentoring. Sup. bus. dev. in strategic cust. accts. Util. RDBMS, SQL, Unix, & Win o/s. REQ: BS in Bus, Bus. Admin, Econ, or Finance + 5 yrs. exp. in full life cycle dsgn, dev, impl, & config. corp. e-com & e-bus. info. sys. util. RDBMS, SQL, Unix, & Win o/s. Plus 2 yrs. proj. mngmt exp. supr. enterprise level IT dev. teams. Prem. sal + benes. Pls reply to Technical Recruiter, Job #CO-102, 11250 Kirkland Wy, Ste 101, Kirkland, WA 98033.

Askme seeks DBAnalyst for Seattle Office: DESC: Dsgn, dev & impl RDBMS & related GUI & middle tier components util SQL, Java, C++, ASP, VBScript, JScript, HTML, XML, XSL & Win based O/S, InstallShield. REQ: BS in Engineering, CS, MIS, Math or Phys + 2 yrs of exp in the duties of the job offered. Pls send resume: B Pfeiffer, AM-101 Askme 3290 146th Place SE, Suite D Bellevue, WA 98007

Systems Analyst: Troubleshoot and test applications used in Web-related or Client/Server Projects.
Must have BS in Comp Sc/Eng. field and 3 yrs Exp. or MA/MS degree.
Contact: Infobahn Software Inc
3140 DeLaCruz Blvd #108
Santa Clara, CA 95051

IT Project Leader, Energy Services

Who we are GE Power Systems is the world's leading supplier of power systems equipment and services with global annual sales of over \$14 billion. Our innovative team spirit and progressive challenges have made GE Power Systems an environment offering exceptional opportunities.

Who we seek The IT Project Leader will drive existing IT efforts to create a competitive advantage for company operations. The Project Leader will lead the assigned organization into the E-Economy; work with senior leadership to execute the business strategies with a technology focus; and benchmark internal and external business processes to identify best-in-class IT processes. The IT Project Leader will address IT-related acquisition, due diligence and integration issues; provide product support; understand, develop and execute ERP strategies; and drive standardization across the businesses.

The IT Project Leader must hold a BA/BS in a technically related field and demonstrate outstanding communication, presentation, facilitation and training skills. The IT Project Leader will demonstrate a proven track record of delivering results and leading teams in a dynamic business environment, and will possess strong technical and business skills, coupled with strong knowledge of e-commerce and its application in business skills, coupled with strong knowledge of e-commerce and its application in a business environment. The IT project Leader will be familiar with structured project management methodology in software development and delivery, and must have 3 + years' experience in formulating and implementing business strategies with senior management using a quality methodology and digitization.

How to apply We offer a competitive salary, an outstanding benefits package and the professional advantages of an environment that supports your development and recognizes your achievements. To apply, please send your resume, referencing code GEPS/278030/AN030, to: opportunities@gecareers.com. An equal opportunity employer.



GE Power Systems

We bring good things to life

It's like having
the inside track on
all the hottest tech jobs,
all the time.



The hottest job leads you can't find anywhere else are all right here. That's because Dice is all tech jobs, all the time. Get the inside track on the best tech jobs. Go to dice.com today.

DICE

Tech Jobs. Tech Talent.

© 2002 Dice.com

Software Engineer sought by telecommunications company in Rochester, NY to work in Boulder CO. At a senior level, engage in design and development of computer software applications or modules that incorporate client/server architecture, operate on UNIX platform and access Oracle relational database management systems. Analyze user interaction requirements, engage in design, development and documentation of the software applications. Use programming language C and C++, Oracle and shell scripting in the design and development process. Act as mentor to other software developers. Requires Master's or equivalent in Computing and Information Systems. Specifically, position requires a master's or foreign equivalent or a bachelor's or foreign equivalent plus five years of progressive software development experience. One year experience as Software Engineer performing the core duties and using the technologies described above. M-F; 8am-5pm. \$73,000/yr. Respond by resume to Employment Programs, P.O. Box 46547, Denver, CO 80202 & refer to Job Order Number CO 5025434.

Terayon Communications Systems, Inc., has an immediate career opportunity for talented people with appropriate experience. We are currently recruiting for the following position: Technical Service Manager-The aforementioned position requires a minimum of a B.S. in Electrical Engineering, Computer Science or a related field and 0-5 years' experience in the IT/Telecommunications field. Send resumes to: Staffing Department, resumes@terayon.com Terayon Professional Staffing 4988 Great American Parkway Santa Clara, CA 95054 We are an equal opportunity employer offering excellent compensation and benefits.

Job Title : Programmer Analyst
Job Type : Full Time
Company Name : MAXIL Technology Solutions Inc
Duties: Analyze, design, develop and test system and software using Oracle, PL/SQL and Oracle Developer 2000. Extensive experience in Customizing the forms and reports in various modules of Oracle Apps 11i. Strong Order Management Experience is a plus with customization in QEI, INV, BOM, CS, WIP. Experience in Project Documentation using AIM Methodology. Experience with FSA desired and should have extensive experience in Creating Interfaces to Load the data from Legacy system and INV & OE interfaces. Strong Data Warehousing experience is a must. Experience in Cognos/Informatica and Business Objects required. Position would involve data maintenance, development and maintenance of modules developed in Oracle Forms and Reports. Desirable that candidates are able to develop and maintain reports in Crystal Reports, Cognos, Essbase. Should also be able to convert the technical specifications to the code. Education & Experience: Bachelors/Masters in science/Engineering with 4-5 years of experience in Oracle, PL/SQL, Oracle Financials 11i, ETL tools. Experience in insurance and Pharmaceutical industries is desirable. Should be able to develop Pseudo code. Experience in C, C++, Perl, CGI, Shell Scripts desired. Salary: \$58,000 to \$65,000 Contact: resumes@maxiltechnology.com 877-853-6009(F) 877-936-2945(T)

Financial Analyst
Review and analyze financial information and data and develop mathematical and statistical models with respect to worldwide petroleum industry and commodities; design, develop and integrate databases for use in modeling economic and financial trends and conditions in the petroleum industry and petroleum markets; and prepare financial forecasts, reports and reporting systems on petroleum products, petroleum markets and general economic conditions and trends; utilizing Fuzzy Query and Analysis, Cluster Analysis, Data Visualization, SQL, Linear Equations, Data Normalization, EDI Mapping and Black and Schols Model. Requires M.S. or M.B.A. or equivalent masters level degree with focus in finance and one year experience in computer modeling of economic phenomena involving petroleum commodities. Qualified applicants must presently be eligible for permanent employment in the United States. Successful applicant must be able to perform job duties on date of application. 40 hours per week (8:30 a.m. to 5:30 p.m.); overtime as needed without additional compensation. Position is with GP&W, Inc. d/b/a Center Oil Company, 600 Mason Ridge Center Drive, St. Louis, Missouri 63141. Send resumes to: John Niemi, Chief Financial Officer, GP&W, Inc. d/b/a Center Oil Company, 600 Mason Ridge Center Drive, St. Louis, Missouri 63141. EOE

PROGRAMMER/DATABASE ADMINISTRATOR. Provide programming support and database administration, including primary database support for production Oracle databases. Provide database application programming solutions and integrate them into business processes; develop reports using SQL and SQR tools; create test environments and evaluate upgrades; manage and optimize performance of data system architecture and devices. Requires B.S. Computer Information Systems, Computer Science, or a related field; Two (2) years experience in job offered or software developer using Oracle, SQL, SQR, Forms 3.0 and ERP or MRPII software. Send resume to Dawn Griffin, DRA, 2902 Enterprise Drive, Anderson, IN 46013.

Computer Systems Analyst who will plan, analyze, design, develop and enhance ERP and client server based applications using working knowledge of PeopleSoft Financials 6.0/7.0/7.5/8.4, PeopleCode, People Tools, SQR, Crystal Reports and nVision. Will design, implement and customize PeopleSoft HRMS and Financial Applications using SYBASE, UNIX, JDBC, PL/SQL, Oracle 8.x, Windows NT/98, Java 2.0 and JDK. Applicant must have at least five and one half years experience planning, analyzing, designing and enhancing ERP and client server based applications. Applicant must have working knowledge of PeopleSoft Financials 6.0/7.0/7.5/8.4, PeopleCode, People Tools, SQR, Crystal Reports, nVision, SYBASE, UNIX, JDBC, PL/SQL, Oracle 8.x, Windows NT/98, Java 2.0 and JDK. Applicant must have a Bachelor's degree or foreign degree equivalent in Engineering or Computer Science. Work involves extensive travel and frequent relocation. \$70,500/year, 40 hours/week, 9:00am-5:00pm. Send resume, listing Job Order Number WEB 265177, to JS Supervisor, Green County Team PA CareerLink, 4 West High Street, Waynesburg, PA 15370-1324

Database Administrator sought by computer technology company in Westminster, CO to work in Westminster and other unanticipated job sites in the US. Design, install, maintain, and administer relational database management systems. Engage in database and related software application design and development. Design and establish physical database parameters. Create and implement ORACLE security and backup recovery procedures. Engage in performance monitoring and tuning of the ORACLE relational database management systems and related software applications using Spotlight and other monitoring tools. Provide user training and support. Requires Bachelor's or foreign equivalent in information technology, computer science, or related field; Working knowledge of creating and implementing ORACLE security and backup recovery procedures. 8am-5pm, M-F; \$62,830/yr. Respond by resume to Employment Programs, PQ Box 46547, Denver, CO 80202 and refer to order number: CO5024354.

Design & develop internet/extranet security apps using Java 1.1, ActiveX, Microsoft J++, Symantec Café & JDBC & database modeling for Oracle & SQL backends. Develop database using C/C++ & VB. Req. BS in comp sci & 2 yrs exp as developer, programmer or analyst. Fax Resumes to: J. Cappola, 770-663-8987.

Software Developer - Deerfield Beach, Florida Requires a Bachelor's Degree in Information Technology (or equivalent programming experience) and 2+ years FoxPro / Visual FoxPro programming experience. Develop, implement and maintain application software to established standards and specifications. Develop application software using FoxPro / Visual FoxPro and other approved programming languages. Implement approved changes to application software. Contact: Joe Bozza, Human Resources, Campus Management Corp, 10 Fairway Drive, Suite 300, Deerfield Beach, FL 33441. Email: jbozza@campusmgmt.com. Phone: 954-480-9100.

SOFTWARE CONSULTANT
Analyze & evaluate existing or proposed software systems. Develop, implement and improves programs, systems and related procedures to process data using in-depth knowledge of the software development life cycle. Encodes, tests, debugs and installs operating programs and other system software utilizing ERP Package software (including MFG/PRO, SYMIX and Progress) as well as the Progress 4GL programming language. Bach. degree or equiv. in Comp. Sci., Math, Bus., Engrng or Commerce + 2 years of exp. in position offered or as a Prog. Analyst, Software Engrnr or Systems Analyst req'd. Exp. must include: a) ERP Package software including MFG/PRO, or SYMIX; and b) Progress database and Progress 4GL. High mobility preferred. 40 hrs/wk, 8 am - 5 pm, PT as req'd, \$61,000/yr. Qualified applicants please submit resume to Manager, Washington County Team PA CareerLink, Millcraft Center, Suite 150LL, 90 West Chestnut Street, Washington, PA 15301-4517. Refer to Job Order No. WEB261923.

Systems Engineer to test financial computer software systems used by banks and financial institutions applying techniques of computer science, engineering, mathematical analysis and testing tools. Degree and exper. required. Competitive salary. Send resumes to Juan Carlos Vizcaino, Todo 1 Services, 7600 N.W. 19th St., #600, Miami, Fla 33126.

Sr. Programmer/Analysts to plan, develop, test & document client/server applications programs in Microsoft environment using technology such as VB, NET, Eureka Designer, Eureka MetaData/ Manager, DTS, etc., & write stored procedures using T-SQL Server 2000 under the direction of sr. programmer/analysts. Required B.S.C.S. and Microsoft Professional Certification & 2 yrs. rel. exp. M-F, 40 hrs/wk + o/t. Freq. reloc. within U.S. may be necessary. Send resume to J. Brigham, HR Ref. A11/A20, TEK Systems, Inc., 7301 Parkway Drive, Hanover, MD 21076.

Director of Management Information Systems-define, direct and oversee implementation of technology strategy to deliver internet services and improve operations for technology and internet industry. Degree plus exper. req'd. Competitive salary. Send resumes to Juan Carlos Vizcaino, Todo 1 Services Inc., 7600 NW 19th St. #600, Miami, FL 33126.

Sr Programmer Analyst. Devel & write computer programs supporting s/ware apps. Bachelor degree in CS or sim field req'd, as is 1.5 yrs as Sr P/A or in an on-line or web-based devel position. Competitive salary. Prior exp. must include 1 yr w/Java, Servlet/JSP, & SQL or SQL Server. Resumes to Becky Schoepfle, Sr Dir of Corp HR, Job No. 1915.11, Sallie Mae, Inc., 11600 Sallie Mae Drive, Reston, VA 20193

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in ASP.NET, C#, SQL Server 2000 and JavaScript. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of ASP.NET, C#, SQL Server 2000 and JavaScript. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: McKeesport/Allegheny City CareerLink, Attn: JS Supervisor, 345 Fifth Ave., McKeesport, PA 15132, Job No. WEB264206.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in C#, ASP.NET, SQL Server 2000 and JavaScript. Requirements: Bachelor's Degree, educational or functional equivalent, in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of C#, ASP.NET, SQL Server 2000 and JavaScript. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Beaver County Team PA CareerLink, 2103 Ninth Ave., Beaver Falls, PA 15010-3957, Job No. WEB264203.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in ColdFusion, Perl, SQL Server and PL/SQL. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of ColdFusion, Perl, SQL Server and PL/SQL. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Armstrong County Team PA CareerLink, 1270 North Water St., PO Box 759, Kittanning, PA 16201-0759, Job No. WEB264173.

DATABASE ADMINISTRATOR

Database Administrator to do Logical and physical design of Oracle database; Code test and implement Oracle scripts applying knowledge of Database Management Systems; Calculate optimum values for Oracle database parameters; performance tune Oracle databases; Model Oracle database security; manage backup and recovery of Oracle databases; make changes to Oracle database applications using knowledge of Oracle Applications 11i, Oracle 8i, SQL*DBA and PL/SQL. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a Database Administrator, Expertise in Oracle database administration which includes logical design, physical design, performance tuning, backup and recovery, coding of scripts, knowledge of Oracle Applications 11i, Oracle 8i, SQL*DBA and PL/SQL. Salary: \$90,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and relocation. Apply: JS Supervisor, Greene County Team PA CareerLink, 4 West High Street, Waynesburg, PA 15370-1324, Job No. WEB264251.

Chemist-Application Developer II NEUROGEN CORPORATION has an immediate opening in its Branford, Connecticut facility for a Chemist - Application Developer II. Support the High Speed Synthesis unit of the company's Accelerated Intelligent Drug Discovery (AIDD) System, develop different applications to generate new chemical entities, oversee and maintain the automated chemical synthesis station and characterize synthesized compounds for optimal purity and chemical efficiency. Must possess at least a Master's degree or its equivalent in Chemistry, Biochemistry or a related scientific field and relevant experience/training with computer programming and analysis, Object Oriented Programming, Programming languages: C++, C, Visual C++, Java, Visual Basic, Relational Databases and SQL, Quality Assurance and Software Testing, Software Verification and chemical characterization. Resume and/or cover letter must reflect each requirement above and specify reference code C-AD II or it will be rejected. Forward resume to: Hilary Buckley, Human Resources, Neurogen Corporation, 35 Northeast Industrial Road, Branford, CT 06405; Email: resumes@nrgn.com. EOE. Visit us on the web at www.neurogen.com

Computer Networking Analyst- Analyzes computer networking requirements to plan large data centers, e-commerce, e-business networks that will provide reliable and smooth flow of data, voice and video. Plans layout and installation of high volume data voice video networks of new systems or modification of existing systems. Confers with data processing, project managers work flow analysts, client network administrators, business managers and users to obtain information on limitations and capabilities of the existing system and capabilities, bandwidth requirements and workload projects. Evaluate factors such as total users, applications, and bandwidth requirements of each application, volume of data transactions, medium of information to be handled by the network equipments. Response time requirements, cost constraints and need for security and access restrictions to determine hardware configuration, security policy and profile, optimal media and path selection based on cost, security and scalability. Bachelor's degree required. Degree must be in one of several limited fields: computer engineering, information science or math. Must have at least 5 years of experience as a computer professional with LAN /WAN, enterprise networks, intranets, project management and business negotiations. 40 hrs/wk, M-F 9-5, \$56,500/yr. Must have proof of legal authority to work in the United States. Submit resume to the Iowa Workforce Center, P.O. Box 729, Cedar Rapids, IA 52406-0729. Please refer to Job Order IA1101589. Employer paid advertisement.

Security Engineer: Plan, co-ord, implement security measures to safeguard info in comp files against accidental/unauthorized modification, destruction, disclosure. 8a-5p. Req: 4 yrs exp or as Network Admin &/or Assoc System Admin &/or System Anal. Resume: E Lambert, Guarded Networks, 2525 Embassy Dr S, #10, Cooper City, FL 33026.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in See Beyond e*gate, HIFAA and Oracle 8i. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of See Beyond e*gate, HIFAA and Oracle 8i. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Butler County CareerLink, Pullman Commerce Center, 112 Hollywood Drive, Suite 101, Butler, PA 16001, Job No. WEB264196.

WEB DESIGNER to design and develop web page using Photoshop, Fireworks and Javascript; maintain and monitor internal Intranet site, ensure appropriateness, publication standards, image consistency and corporate identity standards; conceptualize the visual elements of current and future projects; organize content into a user-friendly, functional, interactive web design using Dreamweaver, Cold Fusion and database integration. Require: Bachelor's in Computer Science/Information Systems. Competitive salary and benefits. Apply with resume to: Bernie Kida, Children's Healthcare of Atlanta, 1699 Tullie Circle, Atlanta, GA 30329 (Job #JAR001).

Programmer Analyst to analyze and evaluate existing or proposed systems, and revise computer programs, systems and related procedures to process data. Prepare charts and diagrams to assist in problem analysis, and submit recommendations for solution. Prepare program specifications and diagrams, and develop coding logic flowcharts. Encode, test, debug, and install the operating programs. Bachelor's degree, computer Science, Engineering, or Information Systems and minimum 2 yrs. Experience.

Software Engineer to provide functional and empirical analysis related to the design, development and implementation of software operating systems; including, but not limited to, utility software, development software, and diagnostic software. Participate in the development of test strategies, devices and systems. Bachelor's Degree in Engineering, Computer Science, or Information Systems and minimum 5 years experience, or Masters Degree and 2 years experience. Send resume to PlanetPro at 2893 Sunrise Blvd, Suite 107, Rancho Cordova, CA 95742, Attn: HR, or jperry@planetpro.com.

SOFTWARE ENGINEER

Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Oracle Express OLAP Server, Developer 2000, SQR and Pro*C. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a software engineer or computer programmer, knowledge of Oracle Express OLAP Server, Developer 2000, SQR and Pro*C. Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Manager, Westmoreland County CareerLink, 300 East Hillis St., Youngwood, PA 15697, Job No. WEB264178.

Computer Programmer: For Internet domain name registrar, resp for full-life cycle of registrar apps & other domain registration products, incl On-line credit card payment system through Cyber-source w/ Advanced Fraud Screening. Design, develop, maintain & debug existing & new registrar systems; translate functional specs into technical specs; perform complex coding assignments; develop & execute tests; provide tech assistance to support team & developers. Req's: Master's Degree with major in Comp Sci or related field. 2 yrs exp in job offered or 2 yrs exp as Computer Programmer. Exp must incl developing On-line credit card payment system through Cyber-source w/ Advanced Fraud Screening. Prof in Java, Perl, C/C++ & SQL. Excellent analytical & problem solving skills. 40 hrs/wk. Send resume to M.S. Hemphill, VF, 23 West Fourth St., Bethlehem, PA

SENIOR SOFTWARE ENGINEER to design, develop and test various modules of embedded software for the mobile communication industry using ITU standards; Develop various applications under Windows NT, SUN Solaris and UNIX operating systems using C, C++ and Assembly; Perform source control using Clearcase tools; Port applications in an embedded RTOS environment; Test and debug embedded applications using incircuit emulator and logic analyzer; Develop and implement solutions to highly complex technical problems involving multisite development; Provide technical support to engineers and technical staff. Require: Bachelor's degree in Computer Science, an Engineering discipline, or a closely related field with five years of progressively responsible experience in the job offered or as a Programmer/Analyst. Competitive salary offered. Apply by resume to: Alex Putman, Matsushita Mobile Communications Development Corp. of USA, 1225 North Brook Pkwy., Suwanee, GA 30024; Attn: Job MS.

IT Systems Consultant
-Bethesda, MD-

Global traveler food service co. Duties: design, develop, modify, implement, support PeopleSoft HRMS and T&L systems. Min. req's: BS/BA/equiv. in Business Admin. with major in CSci or MIS/closely related field and 2 yrs. exp. in the duties and with PeopleSoft, SQR skills. Full Time. Email resume with Job Code: IT Consultant to: resumes@hmshost.com (subject line must include IT Systems Consultant) • eoe/mfdv/dfw

SENIOR SOFTWARE ENGINEER to lead a team in the design, development and implementation of application software using C, C++, Visual Basic, ASP, SQL Server, Oracle, Crystal Reports, HTML, JavaScript, XML, XSLT, Java, Servlets, JSP, EJB, Weblogic, IEEE 488 Interface protocol, GPIB, WINRT VB, VB.NET and ASP.NET. Mentor junior engineers and programmers. Require: B.S. degree in Computer Science, an Engineering discipline, or a closely related field with five years of progressively responsible experience in the job offered or as a Programmer/Analyst or Programmer. Extensive travel on assignment to various client sites within the U.S. is required. Competitive salary offered. Apply by resume to: Ravi Kandimala, President, Everest Computers Inc., 900 Old Roswell Lakes Parkway, Suite 300, Roswell, GA 30076; Attn: Job RG.

DATABASE ADMINISTRATOR Multiple openings for Database Administrators to do Logical and physical design of Oracle database; Code test and implement Oracle scripts applying knowledge of Database Management Systems; Calculate optimum values for Oracle database parameters; performance tune Oracle databases; Model Oracle database security; manage backup and recovery of Oracle databases; make changes to Oracle database applications using knowledge of Oracle 7.3, SQL*DBA, Pro*C and PL/SQL. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a Database Administrator, Expertise in Oracle database administration which includes logical design, physical design, performance tuning, backup and recovery, coding of scripts, knowledge of Oracle 7.3, SQL*DBA, Pro*C (tools) and PL/SQL (language). Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and relocation. Apply: Manager, Washington County Team PA CareerLink, Millcraft Center, Suite 150LL, 90 West Chestnut Street, Washington, PA 15301-4517, Job No. WEB264241.

Software Engineer. Plan, design, develop, test, prepare documentation and implement financially oriented enterprise systems; analyze / assist in conversion of legacy and client/server systems to transactional relational database web applications using object-oriented methodology. Create software install packages and manage deployment.

BS in Computer Science or equiv. + 5 yrs. experience, incl. 3 yrs. developing client/server or web applications using IIS, ASP, VB, VBScript, Visual Source Safe, and writing PL/SQL stored procedures, packages, views, and triggers in MS NT/2000 and/or Oracle environments. 40 hrs/week from 8-5. Mail resumes to: Foodbuy, LLC, 1000 Mansell Exchange West, Suite 300, Alpharetta, GA 30022. M/F/D/V.

PROGRAMMING ANALYST, Atlantic Envelope Company, a business unit of National Service Industries, Inc., and a leader in the manufacture and sale of custom paper products for over 100 years, is currently seeking a Programming Analyst for its Baan ERP implementation team. This professional is an important member of our ABES Team (Aeco Business Enterprise System), and will be responsible for the design, development, and maintenance of business software solutions in the areas of finance, manufacturing, and distribution. Project Management, requirement definition, web design, server upgrade, programming, testing, system administration, and user support will be necessary. Software utilized include in Baan, Vertex, Harbinger, Hyperion, Ceridian, HTML, Java, and Jrun in Unix, and Windows and Linux environment. MS in Computer Science/Information Systems is required. Competitive salary plus bonus and benefits. For consideration please send resume to: Attn: BPA1, MS #111, Atlantic Envelope Co., 1420 Peachtree Street NE, Atlanta, GA 30309.

IT Director, Latin American Region Overall Dept. strategy incl. budget planning; active participation in direction/support to bottler's worldwide network; set priorities and technical direction; focus on personnel motivation and create team environment to improve productivity; travel to South American and Spanish speaking. Req. Bachelor's in Comp. Sci., Elec. Eng., related or equiv. and 8 yrs. exp. in job offered or 8 yrs. exp. as IT Mgr. Resume to HR, Pepsico Beverages Int'l 800 Fairway Dr., Ste. 400 Deerfield Beach, FL 33441. No calls please.

We seek IT professionals with industry exp. in ERSI, TaskMate, Navision Financial Server, GIS, Unix SVR4, HP-UX, IRMX, VxWorks, CORBA, C++, etc. Pay matching exp. Foreign educ. equiv. accepted. Travel/relocation reqd. Resume to Global Resources Mgmt., Inc, 3355 NE Expwy, Ste. 205, Atlanta, GA 30341.

DATABASE ADMINISTRATOR Database Administrator to do Logical and physical design of Oracle database; Code test and implement Oracle scripts applying knowledge of Database Management Systems; Calculate optimum values for Oracle database parameters; performance tune Oracle databases; Model Oracle database security; manage backup and recovery of Oracle databases; make changes to Oracle database applications using knowledge of Oracle 7.3, SQL*DBA, Pro*C and PL/SQL. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and two years experience as a Database Administrator, Expertise in Oracle database administration which includes logical design, physical design, performance tuning, backup and recovery, coding of scripts, knowledge of Oracle 7.3, SQL*DBA, Pro*C (tools) and PL/SQL (language). Salary: \$66,000/year. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and relocation. Apply: Manager, Washington County Team PA CareerLink, Millcraft Center, Suite 150LL, 90 West Chestnut Street, Washington, PA 15301-4517, Job No. WEB264241.

It's Fast.

It's Huge.

It Crosses
Worlds &
Dimensions.

IT CAREERS

How to Contact Computerworld

TELEPHONE/FAX

Main phone number..... (508) 879-0700
All editors unless otherwise noted below
Main fax number..... (508) 875-8931
24-hour news tip line..... (508) 620-7716

E-MAIL

Our Web address is www.computerworld.com.
 All staff members can be reached
 via e-mail using the form:
firstname_lastname@computerworld.com.

All IDG News Service correspondents
 can be reached using the form:
firstname_lastname@idg.com.

LETTERS TO THE EDITOR

Letters to the editor are welcome and
 should be sent to: **letters@computerworld.com.**
Include your address and telephone number.

MAIL ADDRESS

**PO Box 9171, 500 Old Connecticut Path,
 Framingham, Mass. 01701**

SUBSCRIPTIONS/BACK ISSUES

Subscription rates: U.S., \$68/year; Canada,
 \$110/year; Central and South America,
 \$250/year; all others, \$295/year

Phone..... (800) 552-4431
E-mail..... circulation@computerworld.com
Back Issues..... (508) 988-7590

REPRINTS/PERMISSIONS

Phone... Ray Trynovich (717) 399-1900, ext. 124
E-mail..... rtry@reprintbuyer.com

CONTACTING CW EDITORS

We invite readers to call or write with their
 comments and ideas. It is best to submit
 ideas to one of the department editors and
 the appropriate beat reporter.

Editor in chief Maryfran Johnson (508) 820-8179
Editorial director, print/online Patricia Keefe (508) 820-8183

DEPARTMENT EDITORS

News editor Oon Tennant (508) 620-7714
Assistant news editor Craig Stedman (508) 820-8120
Management editor Julia King (610) 532-7599
Technology editor Tommy Peterson (508) 620-7729
Director, Knowledge Centers Mitch Betts (301) 262-8243

REPORTERS

Mobile computing/wireless; Bob Brewin (301) 277-8069
health care;
Intel PCs and servers
Internetworking; network Matt Hamblen (508) 820-8567
systems management; energy
Information economics; Thomas Hoffman (845) 988-9630
IT investment issues
Financial services; storage; Lucas Mearian (508) 820-8215
IT management
General assignment; trans- Linda Rosencrance (508) 628-4734
portation/carriers; automotive
Microsoft; middleware; app Carol Sliwa (508) 628-4731
development; retail industry
Supply chain; ERP; CRM; data- Marc L. Songini (508) 820-8182
bases; data warehousing; CA
State/federal government; Patrick Thibodeau (202) 333 2448
antitrust; legal issues; politics

Security; defense and Dan Verton (703) 321-2277
aerospace; travel
Enterprise systems; ASPs/ Jaikumar Vijayan (630) 978-8390
outsourcing; security;
heavy manufacturing
General assignment; Linux Todd Weiss (717) 560-5255
and Unix operating systems;
messaging

OPINIONS

Opinions editor Mark Hall (503) 391-1158
Senior news columnist Frank Hayes (503) 252-0100

FEATURES EDITORS

Special projects editor Ellen Fanning (508) 820-8204
Technology evaluations editor Robert L. Mitchell (508) 820-8177
Editor at large Gary H. Anthes (703) 536-9233
Assistant features editor Jean Consilvio (508) 820-8562

COMPUTERWORLD.COM

Online director Tom Monahan (508) 820-8218
Managing editor/online Sharon Machlis (508) 820-8231
Online news editor Ken Mingis (508) 820-8545
Online editor at large Marian Prokop (508) 620-7717
Online editor at large Brian Sullivan (508) 620-7780
Associate art director David Waugh (508) 820-8142
Associate art director John R. Brillion (508) 820-8216
Online production coordinator David Ramel
and e-mail newsletter editor
Marketing associate/ Keeley Guillerme
researcher
Web development manager Peter Smith
Web developers Kevin Gerich, Mark Savery
Associate Web developer Bill Rigby
Graphics designer Matthew Moring

RESEARCH

Research manager Mari Keefe
Research associate Gussie Wilson

COPY DESK

Managing editor/production Jamie Eckle (508) 820-8202
Assistant managing editor/ Michele Lee (508) 820-8126
production
Senior copy editor Bob Rawson
Copy editors Jacqueline Day, Mike Parent,
 Monica Sambataro

GRAPHIC DESIGN

Design director Stephanie Faucher (508) 820-8235
Associate art director April O'Connor
Graphics designer Julie D'Errico
Graphics coordinator Susan Cahill
Cartoonists Rich Tennant, John Klossner

ADMINISTRATIVE SUPPORT

Office manager Linda Gorgone (508) 820-8176
Administrative assistant Cheryl Dudek (508) 820-8178

CONTRIBUTING COLUMNISTS

John Berry, David Foote, Pimm Fox, Michael Gartenberg,
 Dan Gillmor, Thornton A. May, David Moschella,
 Bart Perkins, Nicholas Petreley, Fran Quittel

CONTRIBUTING WRITERS

James Cope, Amy Helen Johnson,
 Kathleen Melymuka, Oeobrah Radcliff

COMPANIES IN THIS ISSUE

Page number refers to page on which story begins.
 Company names can also be searched at
www.computerworld.com

@STAKE INC. 29
 AEROJET 1
 AETNA INC. 12
 AKAMAI TECHNOLOGIES INC. 6
 AMERICA ONLINE INC. 9
 AMERICAN BAR ASSOCIATION. 6,48
 AMERICAN COMMITTEE FOR
 INTEROPERABLE SYSTEMS 6
 AMERICAN LAW INSTITUTE. 46
 AMERICAN NATIONAL STANDARDS
 INSTITUTE. 12
 AMR RESEARCH INC. 7,34
 APPLE COMPUTER INC. 17
 ARTINSOFT 38
 AT&T WIRELESS SERVICES INC. 10
 BEA SYSTEMS INC. 6
 BENTLEY COLLEGE. 1
 BLACKSUN INC. 1
 BOSCOV'S DEPARTMENT STORES. 1
 BURLINGTON COAT FACTORY CORP. 26
 BUSINESS SOFTWARE ALLIANCE 8
 CABLE & WIRELESS PLC 6
 CALPINE CORP. 9
 CARNEGIE MELLON UNIVERSITY 17
 CAROLINA POWER & LIGHT CO. 10
 CASCAOE DESIGN INC. 27
 CERT COORDINATION CENTER. 17
 CGI GROUP INC. 35
 CIA 1
 COMMUNICATOR INC. 9
 COMPUTER & COMMUNICATIONS
 INDUSTRY ASSOCIATION 8
 COREL CORP. 26
 CORPORATE CONTRACTS LLC 6
 COUNTERPANE INTERNET
 SECURITY INC. 36

O.H. BROWN ASSOCIATES INC. 1
 DAIMLERCHRYSLER AG 32,34
 DEFENSE ADVANCED RESEARCH
 PROJECT AGENCY 8
 DELL COMPUTER CORP. 12,19
 DELOITTE CONSULTING. 33
 DELPHI CORP. 10
 DESERET MUTUAL BENEFITS
 ADMINISTRATORS. 6
 DELL FOOD CO. 31
 ORESOMER KLEINWORT WASSERSTEIN 18
 EASYASK INC. 7
 EDOIE BAUER INC. 7
 ELECTRONIC DATA
 SYSTEMS CORP. 32,34,35
 EMC CORP. 12
 ENOECA TECHNOLOGIES INC. 7
 ENTERPRISE STORAGE GROUP INC. 12
 FARPOINT GROUP. 10
 FBI 17
 FEDERAL AVIATION ADMINISTRATION 9
 FEDERAL COMMUNICATIONS
 COMMISSION. 10
 FEDERATION OF AMERICAN SCIENTISTS 1
 FIREMAN'S FUND INSURANCE CO. 35
 FMC CORP. 35
 FOOD AND DRUG ADMINISTRATION 38
 FORO MOTOR CO. 32,33,34
 FORRESTER RESEARCH INC. 7,17,22
 GARTNER INC. 1,7,9,18,22,27,35,36
 GENERAL MOTORS CORP. 10,32,34
 GENUITY INC. 116
 GIGA INFORMATION GROUP INC. 8
 GLOBAL CROSSING HOLDINGS LTD. 6
 GOBE SOFTWARE INC. 26

GOLOBERG, GOOLES, ... 10
 WIENER & WRIGHT 36
 GUARDENT INC. 36
 HANOSPRING INC. 10
 HARRIS CORP. 9
 HEWLETT-PACKARD CO. 12,17,19
 HITACHI LTD. 17
 HUGHES HUBBARD & REED LLP 22
 I2 TECHNOLOGIES INC. 34
 IBM. 1,6,8,12,17,18,19,26,28,33,34,35
 IOC. 1,18,36
 IOEFENSE INC. 9
 IM-AGE SOFTWARE INC. 9
 INDUSTRIAL TELECOMMUNICATIONS
 ASSOCIATION 10
 INTEL CORP. 1,18,28
 INTERNATIONAL DATA GROUP. 21
 INTERNET SECURITY SYSTEMS INC. 17,36
 IRWIN HOME EQUITY CORP. 1
 J.O. EDWARDS & CO. 27
 JUNKBUSTERS CORP. 8
 KEYNOTE SYSTEMS INC. 17,18
 LANOS' ENO INC. 7
 LEVERAGE PARTNERS INC. 31
 LEXMARK INTERNATIONAL INC. 19
 LIFFEY NETWORK SOLUTIONS INC. 17
 LOTUS SOFTWARE GROUP 26,33
 MATHSOFT ENGINEERING AND
 EDUCATION INC. 1
 MAXIMUS INC. 17
 MERCAOO SOFTWARE INC. 7
 MICROSOFT CORP. 1,6,8,9,17,
 18,21,26,27,34,38
 MIT 17
 NASA 1
 NATIONAL CONFERENCE OF
 COMMISSIONERS ON
 UNIFORM STATE LAWS 6
 NATIONAL INFRASTRUCTURE
 PROTECTION CENTER 17
 NATIONAL RETAIL FEDERATION 7
 NAVIGANT INTERNATIONAL INC. 22
 NCR CORP. 6
 NEC SOLUTIONS INC. 17

NEIMAN MARCUS ONLINE 7
 NETLEOGER INC. 17
 NETWORK SECURITY
 TECHNOLOGIES INC. 9
 NEW TECH USA 23
 NEWPORT NEWS INC. 7
 NEXTEL COMMUNICATIONS INC. 10
 NINTENDO CO. 21
 NOVELL INC. 8
 OMNIPOD INC. 9
 ORACLE CORP. 17,18,33,38
 ORGANIZATION FOR ECONOMIC
 COOPERATION AND DEVELOPMENT 8
 PEREGRINE SYSTEMS INC. 17
 PRATT & WHITNEY 1
 PRICEWATERHOUSECOOPERS 19
 PRINCIPAL FINANCIAL GROUP 6
 PROBE RESEARCH INC. 1
 PROGRESS ENERGY INC. 10
 PUGET SOUND FINANCIAL CENTERS 28
 RAYTHEON CO. 9
 REO HAT INC. 17
 RECREATIONAL EQUIPMENT INC. 18
 RIPTECH INC. 17,36
 ROCKLAND TRUST CO. 36
 RUTGERS UNIVERSITY 12
 SAFECO CORP. 22
 SANFORD SCHOOL 1
 SAP AG 7
 SAP AMERICA INC. 7
 SEARS, ROEBUCK AND CO. 7
 SHORELINE RESEARCH 10
 SOFTWAY SYSTEMS INC. 1
 SPIEGEL CATALOG INC. 7
 SPRINT CORP. 17
 SPRINT PCS GROUP 10
 STORAGE NETWORKING INDUSTRY
 ASSOCIATION 12
 SUN MICROSYSTEMS INC. 1,6,12,17,26,33,34
 SYMANTEC CORP. 17,29,36
 TACONIC FARMS INC. 8
 TARGET CORP. 1
 TEMPLE UNIVERSITY 7
 TERRA NOVA TRADING LLC 9

THE BOEING CO. 1
 THE COCA-COLA CO. 8
 THE OCTOR'S CO. 36
 THE REGENCY GROUP 36
 THE SAGEZA GROUP INC. 1,12
 THE SPIEGEL GROUP 7
 THE TALBOTS INC. 7
 TPI INC. 35
 TRANSMETA CORP. 17
 TRICON GLOBAL RESTAURANTS INC. 31
 TRIRIGA INC. 17
 U.S. DEPARTMENT OF DEFENSE 1
 U.S. DEPARTMENT OF JUSTICE 8,21
 U.S. FEDERAL TRADE COMMISSION 8
 UBIZEN NV 36
 UNIFORM CODE COUNCIL INC. 8
 UNITED TELECOM COUNCIL 10
 UNIVERSITY OF ARIZONA 6
 UNIVERSITY OF CALIFORNIA, SAN DIEGO 21
 VANTAGE PARTNERS LLC. 35
 VERITAS SOFTWARE CORP. 12
 VERITY INC. 7
 VERIZON COMMUNICATIONS 1,16
 VERIZON WIRELESS 10
 VOLUNTARY INTERINDUSTRY COMMERCE
 STANDARDS ASSOCIATION. 8
 WHERENET CORP. 32
 WIREDREO SOFTWARE INC. 9
 WORLOCOM INC. 1,6,9,35
 XIMIAN INC. 26
 ZAGAT SURVEY LLC 22

ADVERTISERS INDEX

Apple 2-3
www.apple.com
 Cisco 11
www.cisco.com
 Computer Associates 4
www.ca.com
 Dell 39
www.dell.com
 IBM E-Infrastructure 24-25
www.ibm.com
 IBM Lotus 48
www.ibm.com
 IBM Websphere 37
www.ibm.com
 IDC Enterprise SuperVision 2002 30
www.idc.com/esv02
 IDC European IT Forum 2002 47
www.idc.com
 Imation 13
www.imation.com
 SAS 20
www.sas.com
 Storage White Paper 16/17
www.computerworld.com/services/whitepapers
 Sybase 14-15
www.sybase.com

*Regional Select Edition

This index is provided as an additional service. The publisher does not assume any liability for errors or omissions.

Continued from page 1

Sun

Network Environment application software stack.

The company will also announce plans to release an Intel version of its Solaris 9 Unix operating system, only a few months after it said it was discontinuing Solaris on Intel.

The LinuxWorld announcements will build on a Sun strategy first outlined in February to sell low-end Intel-based Linux and Solaris servers targeted at so-called edge applications such as Web caching, firewalls and streaming media.

The two-processor LX50 Intel server that Sun will introduce this week complements the company's existing Cobalt line of specialty Linux servers. It will allow Sun to tap incremental sales opportunities at the low end, said Bill Roth, a Sun product manager.

"The market has evolved to a point where it is attractive for us to enter it," Roth said. "Linux on Intel-based hardware is working in areas where Solaris isn't playing, especially around the edge of the network."

Evidence of Change

Such initiatives mark a significant departure from Sun's long-held Solaris-only stance and may be an indication that the open-source movement is beginning to hurt the company at the low end, analysts said.

"They are only now realizing the potential of Linux," said Steve Rogoschewsky, co-founder of BlackSun Inc., a Web hosting provider in Saskatoon, Saskatchewan.

BlackSun runs its operation on more than 200 Sun Cobalt servers. "It looks like they are going down the right path. We hope they can take it seriously," Rogoschewsky said.

Sun's move doesn't come a moment too soon for users such as Suzy Hoffman, director of technology at the Sanford

School in Hockessin, Del.

The school is considering moving most of its 125 servers and workstations to Linux, including some Sun Solaris equipment, because of the lower total cost of ownership the operating system has promised, Hoffman said.

Even so, Sun's first foray into the commercial Linux market is less than overwhelming, said Tony Iams, an analyst at D.H. Brown Associates Inc. in Port Chester, N.Y. "This was a necessary but not sufficient step for Sun," Iams said.

By limiting its Linux offering to the low end, Sun is clearly

Cobalt LX50

Sun's new general-purpose, rack-mounted Linux servers, which cost from \$2,795 to \$5,295, include these features:

- Support for up to two 1.4-GHz Intel CPUs
- Up to 2GB of memory
- 36GB SCSI disk

going after the market where Linux has made the most inroads so far, according to Iams. "If they weren't in this market, they would have sim-

ply lost by default," he said.

But Sun trails well behind rivals — most notably IBM — in offering commercial, enterprise-level Linux support, should demand for that materialize, Iams said.

Sun may also be sending a somewhat mixed message about its commitment to open standards by choosing to go with a Sun-branded version of the operating system, said Joyce Becknell, an analyst at The Sageza Group Inc. in Mountain View, Calif.

But Sun is taking pains to emphasize that Sun Linux 5.0 is nothing but a slightly

tweaked version of a standard Linux 2.4 kernel.

"Rather than pass along a standard version unmodified, we fixed a few bugs and optimized it for our servers," said Graham Lowell, a Sun director. The tweaks will allow for better performance and support of Sun's Linux servers, he added. ▀

VENDOR MOVES

Sun is resurrecting Solaris 9 for Intel, reversing an earlier announcement.

QuickLink: 32039

LinuxWorld vendors will tout the cost savings associated with Linux adoption.

QuickLink: 32030
computerworld.com

Continued from page 1

Microsoft

(SFU) product and Windows Embedded and CE operating systems, along with a Web development tool built with help from its community of beta testers, he said.

Microsoft believes that many conference attendees are potential customers and "wants to dispel this perspective that we're myopic about Linux," Houston said.

"It's a heterogeneous world, and we have to be perceived as not having our heads in the sand," he added.

But Microsoft won't stun the technology industry with pledges to rework its Office application or any of its other Windows-based software products to run on the open-source Linux operating system, according to Houston. Perhaps the biggest news that Microsoft will make at LinuxWorld is through its mere presence at an event where it may not be a welcome exhibitor.

"It's daring," said George Weiss, an analyst at Stamford, Conn.-based Gartner Inc. "It's an endeavor by Microsoft obviously to attempt a bit of bridge-building to this community."

Joe Poole, manager of tech-

nical support at Boscov's Department Stores, a Reading, Pa.-based retailer that runs Linux on mainframes, said he would stop at the Microsoft booth and pick up literature if he was attending the LinuxWorld conference.

"People are not going to throw rocks at them," he said. "They're probably going to have very good traffic at their booth. People will be interested to see what they're doing and how it would fit into their environments."

Dan Kusnetzky, an analyst at Framingham, Mass.-based IDC, said he's pleased that Microsoft will showcase its SFU Version 3.0 product at LinuxWorld. Since Linux is highly compatible with Unix, the SFU product will allow the majority of Linux applications, such as the Apache Web server, to run on top of Windows, he noted.

Kusnetzky said the code will run at full speed, with no performance penalty, because the Interix technology Microsoft acquired from Softway Systems Inc. in September 1999 was implemented as "just another Windows subsystem," not as an emulation environment.

"It's one of those things that Microsoft has that is an enormous strength that they seldom talk about," Kusnetzky

said. "The reason they don't speak about it often is because Microsoft would want to re-host applications on Windows. Microsoft really is not interested in coexistence. They're interested in migrations away from Unix and Linux."

Sending the Right Message?

Houston said showcasing the SFU product, which sells for \$99, will send "a good message" about how Windows and Linux can coexist. He said he doesn't want the Linux community "to feel Microsoft and

Brave New LinuxWorld

In its first appearance as an exhibitor at a Linux conference, Microsoft will showcase the following:

Services for Unix 3.0, which will allow Linux applications to run on Windows.

ASP.Net Web Matrix Project, a lightweight development tool, built with help from beta testers, for writing applications that run on Windows.

Windows Embedded and CE operating systems, which can run on devices such as cash registers, where Linux has sparked some interest.

Linux are incapable of being in the same environment."

But Poole said he can't understand why anyone would want to pay for Windows, when the applications at issue already run on Linux, a free operating system.

Some Linux users also may wonder why Microsoft is spotlighting a development tool, ASP.Net Web Matrix Project, which can be used to build applications that run only on Windows and the .Net framework. The tool, built with feedback from 200 beta testers, aims to help developers write applications that use Active Server Pages (ASP) to dynamically retrieve data, according to a Microsoft spokesman.

Houston said he hopes that showcasing a Microsoft tool developed with "more of a community element" to the process will show LinuxWorld attendees that "Microsoft is getting the message of a community model."

Also at LinuxWorld, Microsoft plans to showcase its offerings in the embedded space, where Linux has been a consideration for some enterprise users. Houston said Minneapolis-based Target Corp. originally looked at Linux before settling on Microsoft's Windows XP Embedded for its retail point-of-sale devices. ▀

FRANK HAYES/FRANKLY SPEAKING

UCITA? Try Again

THEY'RE TRYING TO IMPROVE UCITA. They really are. The Uniform Computer Information Transactions Act — the much hated, much pilloried proposed law that would allow vendors to cripple software by remote control, sue users wherever they please and prevent anyone from reporting on software performance — got a new round of amendments two weeks ago. And maybe, just maybe, a bad law got a little less bad.

Some of the language allowing vendors to booby-trap their products is gone in the amended version. The sue-where-you-want pro-

vision is a little less onerous. The blocks to prevent users from sharing test results with one another have been slightly reduced.

Some improvement, huh? Maybe what they should do is just start over.

If you're having trouble remembering exactly which bad law UCITA is, it's the one that started out back in the 1980s as an addition to the Uniform Commercial Code. The idea of the UCC is to have a standard state law, passed by all 50 state legislatures in the U.S., that creates a uniform legal framework for commercial transactions — in this case, for software licenses.

Sound like a good idea? Sure it is. A uniform law would cut down on potential confusion for both software vendors and customers and make buying and selling software much easier.

The tough part, of course, is coming up with a law everyone can agree on. And when it comes to UCITA, the one thing most people agree on is that they don't like UCITA.

In 1999, one of the two organizations responsible for the UCC, the American Law Institute, refused to have anything more to do with the software law. In pulling out, the group cited "significant reservations about some of its key substantive provisions and its overall clarity and coherence." That meant the software provisions couldn't actually become part of the UCC.

The other UCC organization, the National Conference of Commissioners on Uniform State Laws, promoted the software provisions as a stand-alone uniform law later in 1999. But since then, a long list of other organizations have objected to parts of UCITA, including the American Bar Association, more than 30 state attorneys general and

dozens of large corporate IT users.

The result? In three years, UCITA has become law in only two states, while three other states have passed laws that explicitly block parts of UCITA from being enforced. Most of the remaining states are either doing nothing or considering their own anti-UCITA legislation.

That's not a uniform law. And it's never likely to be.

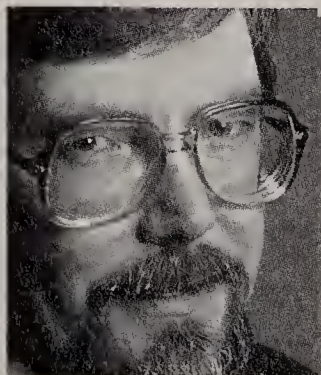
And if UCITA can't serve its fundamental purpose — to provide a standard legal framework for software licenses — it's time to scrap it and try again.

That's surely a bitter pill for the uniform-law commissioners to swallow. They've worked on this for more than a decade. They keep trying to tweak it, adjust it, fix its problems by making the smallest possible changes so as to avoid losing that decade's worth of carefully crafted compromises and agreements.

But a bad law is like badly written software. As every programmer knows, the more software is patched, the more complex it becomes and the harder it is to maintain, and the more likely it is to do unintended things. And no matter how much you patch it, bad software will never become good software — just a little less bad.

Those uniform-law commissioners have learned a lot since they began work in the 1980s on the law that became UCITA. With the knowledge they've gained, they can doubtless create legislation that really will serve as a uniform legal framework, one without UCITA's crippling history and reputation.

But that won't happen until they stop trying to improve the old UCITA and begin work on drafting Version 2.0 from scratch. ▀



FRANK HAYES, *Computerworld's* senior news columnist, has covered IT for more than 20 years. Contact him at frank_hayes@computerworld.com.

SHARK TANK

CIRCA 1980, this mainframe vendor rep pilot fish is assigned to a government customer. Your operating system will go unsupported next year, fish tells systems manager. Have you thought about upgrading? "Of course," says manager — and shows fish the reels of tape containing the new OS. But why aren't you using it? fish asks. "This is the government, remember?" manager says ruefully. "This year they allocated funds to purchase the OS but refused us funds to buy the additional storage we need to use it. Maybe that will come in next year's budget."

PHONE SUPPORT tech to IT pilot fish: "Even if I wanted to help you, I can't because our system is down." Pause. "Uh, what I mean is, the system is down, so I can't help you. I can't even enter a problem record for you if I wanted to."

THIS IT pilot fish sets up a specific time with a user to upgrade her PC, but when he gets there he still has to wade past pictures, souvenirs, calendars, coffee mugs, dust and dirt to swap in the new machine. "When I saw her in the hall a day later, I asked how it was working," fish reports. "In front of co-workers,

she yelled at me for not cleaning the now-visible dust and dirt on her desk — cleaning up after her was *my* responsibility. I laughed and said, 'I only do Windows.'"

EVERY WEEK this production supervisor in Mexico sends a color spreadsheet of material shortages to a purchasing manager pilot fish by fax. Look, we have a WAN, fish tells him. Why not send it by e-mail, or use one of the networked printers so it comes right to me? "The MIS manager won't show us how to do it," supervisor says. "He's too busy analyzing things to find a more efficient way to operate."

MILITARY tech pilot fish remembers a late-1980s project to collect and send daily weather data from the U.S. to Europe for weather modeling. "Only one small issue," sighs fish. "The bandwidth we were provided would take 26 hours to send 24 hours' worth of data."

Tell me your tale: sharky@computerworld.com. You snag a snazzy Shark shirt if we use your true story of IT life. And check out the daily feed, browse the Sharkives and sign up for Shark Tank home delivery at computerworld.com/sharky.

The 5th Wave



Prepare for...

New economic landscapes

New technology solutions

New IT investment strategies

The European IT Forum 2002

Getting Ready for the IT Market Rebound
The Next Wave

16-17 SEPTEMBER 2002
GRIMALDI FORUM, MONACO

The 12th annual European IT Forum is hosted by **IDC**
and sponsored by the following organizations

accenture
Innovation delivered.

CISCO SYSTEMS
EMPOWERING THE
INTERNET GENERATION

hp
invent

Microsoft

We make the net work.

Sun
microsystems

Atos Origin

Novell

SIA

SIEMENS

Sprint

symantec

Media Partners

CIO

LE MONDE

COMPUTERWOCHE

COMPUTERWORLD

Itali@Oggi.it

Le Monde
INFORMATIQUE

ME MIANO

NetworkWorld

THE WALL STREET JOURNAL EUROPE

Our special guests will be chairing "Labs" — interactive focus groups aimed at addressing the key challenges and opportunities for Europe's economy and business

Special Guests

Edward N. Luitwak
Senior Advisor
CSIS

Nicholas Negroponte
Founder and
Director, MIT's
Media Lab

Peter Cochrane
ConceptLabs
Co-Founder and
Former Chief
Technologist
of British
Telecom

Michael Earl
Professor of
Information
Management,
London Business
School

Lester Thurow
Professor of
Management and
Economics, Sloan
School of
Management, MIT

Peter Drucker
Inventor of
Management
Science

Don Tapscott
Author of "Digital
Capital" and
Co-Founder
of Digital 4Sight

Jean Paul Fitoussi
President,
Observatoire
Français des
Conjonctures
Economiques

Robert Lloyd, President, EMEA Operations, Cisco Systems
Glover Ferguson, Chief Scientist, Accenture
Michael D. Capellas, President, Hewlett-Packard Company
John G. Schwarz, President & COO, Symantec Corporation
Len Lauer, President, Global Markets Group, Sprint
Paul A. Stodden, Group President, Siemens Business Services
Simon Witts, Vice President, Marketing, Microsoft EMEA
Robert Youngjohns, VP EMEA, Sun Microsystems

Patrick McGovern, Founder & Chairman, IDG
John Gantz, Chief Research Officer, IDC
Roberto Masiero, President, IDC EMEA
Gigi Wang, SVP Communications and Internet Research, IDC
Tony Picardi, SVP Worldwide Software Research, IDC
Crawford Del Prete, SVP Hardware Research, IDC

To register, contact IDC's EMEA Conference Group

Telephone +39 02 20.226.254 • Fax +39 02 20.226.213 • Email: kschiavi@idc.com



IBM, DB2, Lotus, Tivoli, WebSphere, the e-business logo and e-business is the game, Play to Win are registered trademarks or trademarks of International Business Machines Corporation in the United States and/or other countries. © 2002 IBM Corporation. All rights reserved.

REP SAVES TIME
(STUDYING ONLINE)

CFO SAVES MONEY
(REDUCING TRAVEL)

CEO SAVES DAY
(OUTSMARTING COMPETITION)

Lotus. software

E-LEARNING PLAY

- 1) WIN WITH FLEXIBILITY: Forget about offsites. Train your employees online and you'll get them updated on your company's rules and regulations faster, and keep your bottom line healthier.
- 2) WIN WITH LOTUS: As the market leader in e-learning solutions, Lotus e-learning helps reduce training and travel costs while enabling sales forces to sell new products faster. Lotus. Part of our software portfolio including DB2®, Tivoli® and WebSphere®.
- 3) MAKE THE PLAY: Visit **ibm.com/lotus/learn** and check out an introduction to e-learning Webcast.

@business is the game. Play to win.™